

(IN)EQUITABLE SCHOOL CLIMATE

by

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ABSTRACT

Background. Research examining the role of (in)equitable school climate is a critical line of inquiry that may inform efforts to eradicate disparities in academic, disciplinary, and mental and behavioral health outcomes among Black youth in U.S. schools. Students' perceptions and experiences of inequitable and unsupportive school climate may explain in part why schools are so often ineffective in educating Black students. Disproportionate exclusionary school discipline practices are likely to exacerbate students' inequitable experiences and disparate outcomes.

Objectives. The purpose of this research is to explore theorized antecedents and consequences of inequitable school climate through the following specific aims: 1) to investigate whether differential experience of supportive relationships at school by race explain disparities in psychological outcomes; 2) to explore school organizational health and staff burnout as potential moderators of racial disparities in students' experiences of equitable and supportive school climate; 3) to advance a dialogue on methodological and theoretical issues constraining research examining the contextual effects of school discipline disproportionality; and 4) to examine linkages between discipline disproportionality, inequitable school climate, and racial disparities in students' peer relations and externalizing problems.

Methods. In Aim 1, latent variable modeling was used to identify a theoretical model of inequitable school support and related engagement and social-emotional outcomes among Black and White high school students. Aim 2 used multilevel modeling to examine staff-reported school organizational health as a contextual moderator of racial disparities in Black and White students' experience of equitable and supportive school climate. Aim 3

proposed guidelines and presented a research case study to advance a dialogue on the measurement and modeling of discipline disproportionality within a theory-driven, school climate oriented conceptual framework. Aim 4 employed multilevel modeling to examine the interaction of disproportionate disciplinary contexts with racial disparities in Black and White students' social and emotional outcomes.

Results. In Aim 1, racial inequalities in students' experience of equitable treatment and caring relationships were identified. This differential experience of equity and caring at school explained racial inequalities in students' sense of school belonging. Belonging, in turn, was more salient to Black youth's emotional engagement and externalizing problems than it was for White youth, suggesting a pathway by which behavioral disparities may emerge. In Aim 2, school organizational health was significantly associated with both Black and White youth's experience of equitable and supportive school climate; however, the association was stronger for White than Black youth, contributing to larger racial inequalities in students' school experiences in schools with greater organizational health. In Aim 3 and 4, disproportionate disciplinary contexts were significantly associated with students' perceptions of school inequity and with wider racial disparities in students' peer relations and externalizing problems.

Conclusions. Taken together, these four studies establish links between subjective and objective indicators of inequitable treatment and exclusion in high school and disparities in healthy developmental outcomes among Black youth. Our findings suggest that school-wide reform to promote equitable and culturally sustaining school climate should be a key target in our efforts to eradicate disparities in student outcomes.

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DEDICATION

For my dearly loved parents, Diane and Michael Zmuda, who taught me by example the value of loving-kindness and open-handed generosity.

You gave me the strength to persevere.

For my brother Erik, who lead the way,
and my sister, Jenni, who made it brighter, and so much fun.

For you, Grayson, with all my love.

Let me hear joy and gladness; let the bones you have crushed rejoice. Create in me a pure heart, O God, and renew a steadfast spirit within me. Psalm 51: 8, 10

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Chapter 1

Introduction

Chapter 1

Introduction

Public schools in the U.S. have the potential to influence the developmental outcomes of the vast majority of children and youth in the population, and thus serve as a contextual target of great interest from a public health perspective (Hess, Short, & Hazel, 2012; Kelly & Lueck, 2011). As in other milieus attracting public health attention (e.g., health care settings), racial disparities in youth outcomes continue to plague U.S. schools, despite decades of research and advocacy efforts to redress this problem (Skiba, Michael, Nardo, & Peterson, 2002; Perie, Moran, & Lutkus, 2004; Aud et al., 2011; Wald & Losen, 2007).

This research espouses a health disparities perspective (Dankwa-Mullan et al., 2010) and equity orientation towards the healthy social, emotional, and academic development of Black adolescents. Countering “a retrenchment to deficit views about youth from historically underserved groups” (Artiles, Kozleski, Trent, Osher, & Ortiz, 2010, p. 279), resilience and positive youth development models have gained traction in recent years partly because of their asset- rather than deficit-based approach (Hamilton et al., 2004). Positive youth development is an ecological framework which suggests that healthy development can be promoted through supportive environments (Benson, Scales, Leffert, & Blythe, 2012; Bradshaw, Brown, & Hamilton, 2008). This perspective therefore provides a suitable frame to situate and motivate research questions about disparities in school settings.

Research within the positive youth development literature suggests that engagement with prosocial institutions such as schools and other youth-serving

institutions may promote wellbeing and protect against risk factors for disorders and disease (Bridges & Moore, 2002; Morrison, Robertson, Laurie & Kelly, 2002; National Research Council [NRC], 2004; Scales & Leffert, 1999; Watts and Flanagan, 2007; Youniss et al., 1997; Zaff et al., 2010). Engagement has been recognized as a multidimensional construct and complex outcome of dynamic, reciprocal interactions of student, peer, family, and institutional assets that drive motivation (Skinner & Pitzer, 2012).

Defining Student Engagement

Although student engagement has a history of conceptual “haziness” in the literature (Reschly & Christenson, 2012), a consensus among researchers appears to be emerging around a multidimensional construct of student engagement conceptualized by Fredricks and colleagues (2004) as having *cognitive, behavioral, and affective* dimensions (see Christenson, Reschly, & Wylie, 2012). According to this framework, *cognitive engagement* is a strategic orientation emphasizing an investment in learning, and may include indicators reflecting students’ sense of academic purpose, the value of learning, presence of learning strategies, and relevance of schoolwork to achieving future goals (Fredricks et al., 2004). *Behavioral engagement* is an action orientation stressing cooperative participation, and may include indicators such as attendance, extracurricular activities participation, hard work or effort, persistence, and adherence to school rules (Fredricks et al., 2004). Finally, *affective engagement* is a relationship-driven orientation emphasizing emotional reactions at school, and may include indicators of enjoyment, interest, enthusiasm, frustration, pride, shame, anxiety, satisfaction, and feelings of

belonging (Fredricks et al., 2004). This dissertation focuses on a measure of affective engagement as a key outcome of equitable and supportive school climate.

Equitable and Supportive School Climate

The literature on school climate has emerged alongside decades of research on student engagement. Whereas engagement typically refers to cognitive, behavioral, and affective dimensions of *student* participation, school climate generally refers to qualities of the *school context*, characterized by interpersonal relations, social interactions, teaching and learning practices, norms and values, and organizational procedures (Cohen et al., 2009). The term *equitable* school climate refers to students' full and fair *access* to resources and supports within these cultural, interpersonal, procedural, and teaching and learning spheres (Ross, 2013). School climate is typically measured via perceptions of those interacting with the school environment, such as students, parents, and staff. Student-specific indicators of climate include emotional and physical safety, high expectations and standards, caring student-staff relationships, opportunities for meaningful participation in classroom and extracurricular activities, and school equity and inclusion (Bradshaw, Waasdorp, Debnam, & Lindstrom Johnson, in press; Cohen et al., 2009).

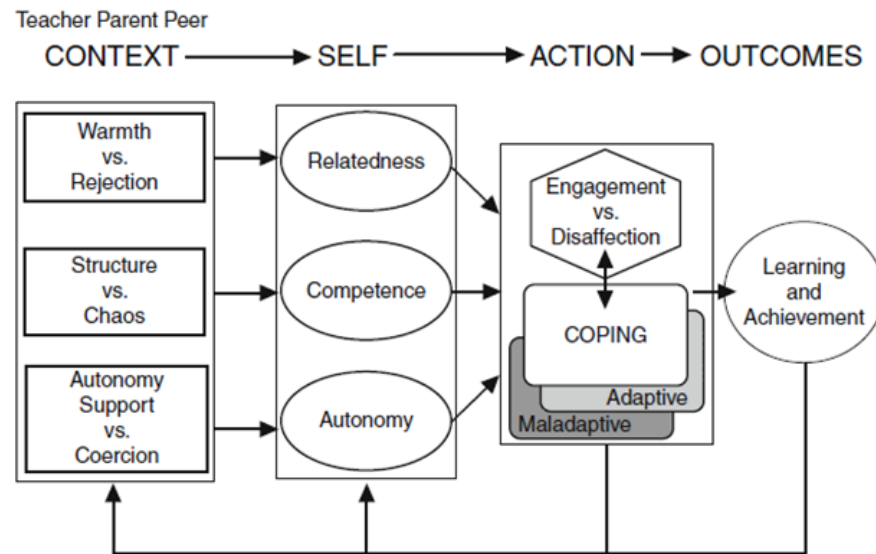
Research supports the use of student perceptions as a valid indicator of school climate (Van Horn, 2003). Yet this paper examines student perceptions in another light – that is, we suggest that students' *perceptions* of school climate matter for their developmental outcomes, whether their perceptions are accurate reflections of the 'true' school climate or not. For example, perceptions of the school psychological environment have been linked to early adolescents' psychological and behavioral functioning in school

(Roeser, Midgley, & Urdan, 1996). Student perceptions may be especially critical to examine in regard to racial, ethnic, and cultural influences on school climate, given research suggesting the role of perceived stigma, stereotypes, and discrimination on academic, mental health, and behavioral outcomes (Benner & Graham; Steele, 1997; Zeiders, Umaña-Taylor, & Derlan, 2012). As emerging research has linked students' perceptions of discrimination with school climate (Benner & Graham, 2013; Stone & Han, 2005), measures of *inequitable* school climate may expand to include perceived discrimination.

Ecological Framework of Engagement Motivation

Despite convergence among researchers around defining types of engagement as cognitive, behavioral, and emotional (Appleton, Christenson, & Furlong, 2008; Fredricks et al., 2004), less careful measurement attention has been given to distinguishing student engagement from outside constructs, such as school climate, or student internal assets supporting engagement. Fredricks et al. (2004) noted that engagement is seldom examined with environmental contexts in mind, an oversight that has created a stumbling block in the field's ability to distinguish between individual and contextual factors affecting student engagement. Recently developed theory on student engagement by Skinner and Pitzer (2012) provides a framework for clarification. Their model (see Figure 1.1. below) defines engagement as a complex outcome of dynamic, reciprocal interactions of student, family, teacher, peer, and institutional assets that drive motivation (Skinner & Pitzer, 2012).

Figure 1.1. Dynamic Model of Developmental Motivation of Student Engagement vs. Disaffection (Skinner & Pitzer, 2012)



Although Skinner and Pitzer’s theory was only recently described in the literature on student engagement, it is essentially an enhanced framework based on a model of motivational development rooted in self-determination theory (Deci & Ryan, 2002), called the Self-System Model of Motivational Development (SSMMD; Connell & Wellborn, 1991; Skinner & Wellborn, 1994), which underlies much of the research on student engagement over the past twenty years. Similar to Maslow’s hierarchy of needs (1943), this model suggests that experiences fulfilling (or neglecting) three basic human needs – the needs for relatedness, competence, and autonomy – shape individual self-concepts, known as self-system processes (Connell & Wellborn, 1991), which are enduring beliefs about the self that influence interpretations of and responses to interactions with the environment. The sections below describe these needs in greater detail, and discuss the supports that schools can provide in response to these student needs in order to promote student engagement.

According to Skinner and Pitzer's model, school social contexts differentially provide warmth/caring, structure, and autonomy support which either help or hinder children and youth in the fulfillment of their basic needs (i.e., relatedness, competence, and autonomy, respectively). In response to school social context experiences, students build self-system processes (stable self-concepts) related to these needs, which in turn motivate either student engagement or disaffection with schools. The central premise of the theory is that when basic student psychological needs are met by school social contexts, students will in turn engage fruitfully with them, but when student needs are frustrated, students will either withdraw or act out.

Within this framework, *relatedness* is defined as a need for belonging and connection, and is theorized to be related to attachment (Ainsworth, 1979). A sense of belonging in school, often associated with a similar construct called school connectedness in the resilience literature, has been linked with engagement (Lynch & Cicchetti, 1992, 1997). The dimension of school support theorized to help meet this need is teacher *warmth/caring* (called *caring* in the present research), which refers to teacher's caring about the students as individuals, and is theorized to promote students' sense of relatedness, connectedness, and belonging at school. *Competence* is defined as the need to feel effective in one's interactions with the world, including the social and physical environment (Elliot & Dweck, 2005; Koestner & McClelland, 1990; White, 1959). Perceptions of self-efficacy related to academic competence have been linked with student engagement and achievement (see Bandura, 1997; Weiner, 2005). The corresponding school support construct theorized by Skinner and Pitzer to enhance competence is *structure* (called *high expectations* in the present research), which refers to

teachers' clearly stated expectations of a high standard of academic effort, which promotes students' academic self-efficacy and competence. *Autonomy* is defined as the need to express one's agency (i.e., the self as the source of action), and is theorized to relate to self-determination (Deci & Ryan, 2002). Research suggests that students with a greater sense of autonomy in school also show higher levels of emotional engagement (Deci & Ryan, 2002; Pelletier, Fortier, Vallerand, & Briere, 2001). The school support theorized to meet students' needs for autonomy is the provision of opportunities for meaningful participation and refers to encouragement and respect for youth agency, which is expected to promote students' belief that they can make a difference in their own lives, in their schools, and beyond.

The above described model of motivational development organized around student engagement builds upon the research of others who have honed in on the important role of supportive school contexts in influencing student engagement (Eccles, Early, Frasier, Belansky, & McCarthy, 1997; Wang & Eccles, 2012), including Hanson and Kim (2007), who measured a construct called "school support" that comprised the warmth/caring (caring relationships) and structure (high expectations) components of school social context described above. This model is also highly complementary with research on school climate suggesting its influence on behavioral and affective engagement as well as a number of other psychological outcomes (Cohen et al., 2009).

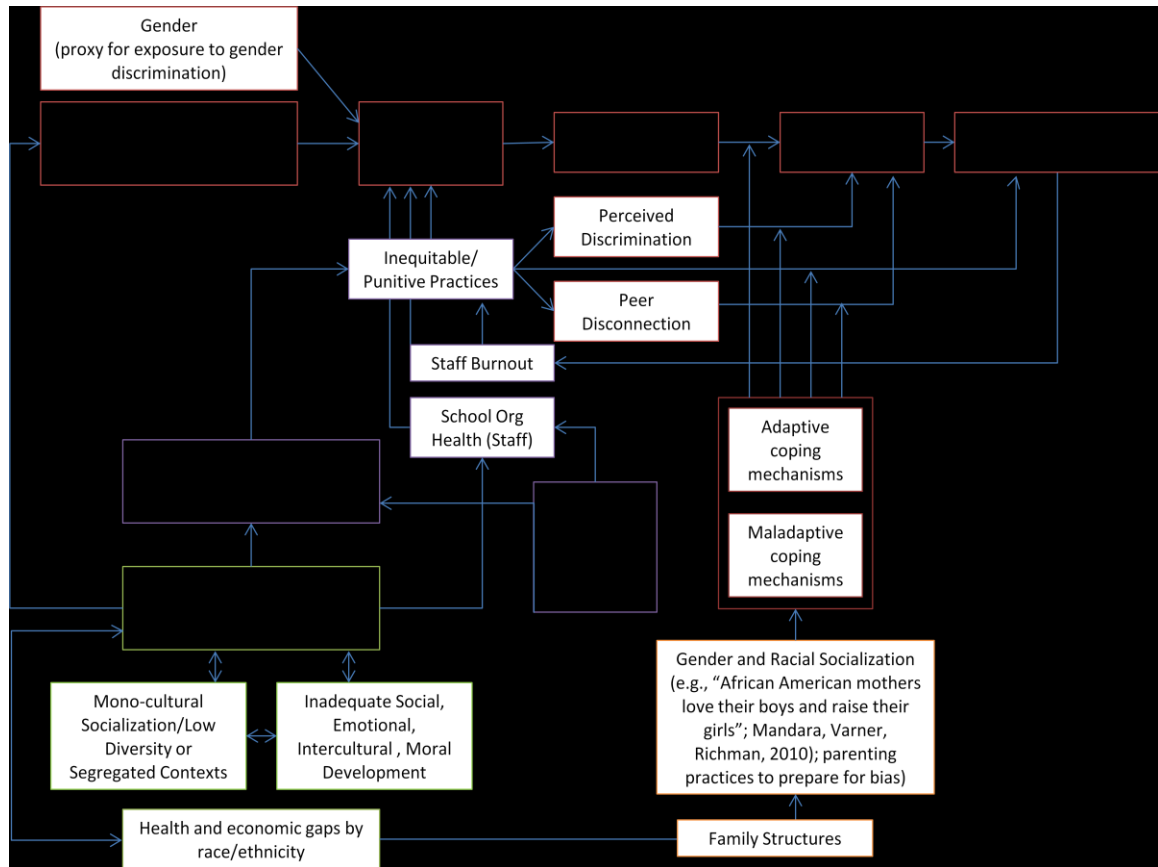
In summary, Skinner and colleagues (Skinner & Pitzer, 2012; Skinner, Kindermann, & Furrer, 2009; Skinner, Marchand, Furrer, & Kindermann, 2008) have specified a developmental framework in which caring, structure, and autonomy support meet students' corresponding needs for relatedness, competence, and autonomy – the

fulfillment of which in turn is theorized to motivate higher levels of engagement in school. The theory posits that this process occurs within a cyclical relationship between student motivation and student engagement that is greatly influenced by social context, consistent with social cognitive theory (Bandura, 1989). Skinner and Pitzer (2012) stress that this cyclical relationship may be “virtuous or vicious” (p. 31), underscoring the critical role the school social context in either mitigating or amplifying the problem of student disengagement.

Cultural and Ecological Discontinuity in Schools

Although this ecological perspective on the motivation of student engagement is developmentally nuanced and clarifies a great deal of the conceptual haziness in definitions related to individual versus contextual (i.e., climate) supports for student engagement, it does not explicitly address processes related to race, bias, and cultural difference that operate within schools. An important critique of the developmental research on youth of color generally is that there is a lack of focus on processes that lead to disparate outcomes among historically marginalized youth (García Coll et al., 1996). More research examining these processes is needed to understand how race may hinder students’ positive school experiences and moderate related psychological processes (Eccles & Roeser, 2011; García Coll et al., 1996). The following sections refer to a conceptual framework that outlines multiple race-, bias-, and culture-related processes that may influence the motivation of student engagement and related outcomes (see Figure 1.2. below).

Figure 1.2. Overarching Conceptual Framework for Thesis Research



Before an in-depth discussion of the conceptual framework, and the cultural-ecological discontinuity model (Bingham & Okagaki, 2012; Ogbu, 1986) that we draw upon to frame processes related to race, bias, and cultural difference in this thesis research, a brief definition of terms is needed.

Defining race and bias. Health disparities research necessitates the examination of risk and protective factors by race and ethnicity (e.g., population profiling; Ellison, 2005). It is the salient role of public health to monitor such population differences in order to develop effective policy and intervention approaches to eradicate inequities and inequalities that engender disparate outcomes (Dankwa-Mullan et al., 2010; IOM, 1988, 2002). Given the history of deficit-oriented research within medical, psychological, and

education literature, it is important to distinguish our view of race from reductionist approaches of the past that have mistakenly conflated race with biological or genetic factors – or more insidiously, with cultural factors in ways that served to further propagate bias. Specifically, this thesis follows a definition of race as a historically determined, self-reinforcing social construct (Ogbu, 1986) that tends to inflate similarities within groups and overstate differences between them (Bradby, 2003). Data on race (i.e., Black or White race) was collected through a set of fixed-response categories (which are defined in more detail in the *Measures* sections of each of the manuscripts). The potential for harmful reification of race through the use of racialized categorizations inherent in such fixed-response options is a concern. Specifically, the fixed response method of racial/ethnic identification is inadequate in its ability to capture the complexity and heterogeneity of individuals’ cultural, ethnic, and racial identities; furthermore, it imposes categories of group identity that may not comprise the most relevant identity grouping to the research participant (Bartlett & Fiander, 1995).

Despite this concern, we contend the method of measurement employed in the data available for study remains suitable for examining the aims of the current thesis research. Although self-assigned racial and ethnic group allows for a richer and more nuanced representation of identity (e.g., providing an opportunity for multiple identity groupings to be described), it nonetheless does not necessarily describe how *others* perceive an individual’s group identity (Hahn, Truman & Barker, 1996). This point alludes to the precise meaning of the term “race” in this thesis research. Specifically, the construct is employed to mean ‘the potential for discrimination [or bias] along the lines of race’ (Ellison, 2005, p. 70). Therefore, race is not used as a proxy for cultural or social

identity, but rather as a proxy for the potentiality of exposure societal, institutional, and individual bias based on phenotypic traits used to characterize race (e.g., skin color). From this standpoint, it can be argued that the method used to capture race in the available data source may enhance the reliability of the construct because it reinforces the associations between race, socioeconomic group, and bias that are sadly inherent in societal structures within the U.S. (Ellison, 2005).

Cultural-ecological discontinuity model. Potential influences of race, bias, and cultural difference are well-framed by the *cultural ecological discontinuity model* (Bingham & Okagaki, 2012; Ogbu, 1997), which highlights two key pathways to harmful outcomes among Black youth.

Ecological discontinuity. The first pathway, which we call *ecological discontinuity* here, highlights how institutional practices and policies within our society have historically disserved and marginalized certain groups (i.e., those who were brought or came to the U.S. under circumstances beyond their control) and that a glass ceiling essentially still remains in effect constraining or otherwise limiting the attainment of fully optimal outcomes that are possible to others. With respect to school climate, ecological discontinuity can be seen in the differential treatment of Black youth, such as is overwhelmingly evidenced by documented racial inequities in U.S. school discipline and special education practices and by persistent racial disparities in student outcomes (Blanchett, Mumford, & Beachum, 2005; Skiba et al., 2002). It can also be seen in the differential supports received among Black youth which are necessary to promote students' academic success and prosocial development. Specifically, the evident segregation of primarily Black and Latino students within low-resource, large schools

characterized by high teacher-student ratios, high rates of suspension, under-qualified teachers and low-income students is a prime example of ecological discontinuity within the broader school community and societal context. These school resource indicators are indicative of concentrated disadvantage (e.g., neighborhood concentrated disadvantage, Sampson, Raudenbush, & Earls, 1997) and have been negatively associated with supportive school climate (Bevans, Bradshaw, Miech, & Leaf, 2007; Griffith, 2000).

A recent debate within the literature is whether desegregated, more racially and ethnically heterogeneous contexts better support outcomes of youth of color, when examining diversity independent of resource context. Research by Seaton and Yip (2009) on classroom diversity (heterogeneity) reported that higher classroom diversity was associated with higher levels of perceived cultural discrimination among Black students; perceived discrimination, in turn, has been linked extensively to more negative developmental outcomes (e.g., Benner & Graham, 2013). Additionally, research suggests that demographic shifts in the racial and ethnic composition of a school community may lead to breakdowns in social cohesion, higher levels of crime, and racial tension (Walsh & Taylor, 2007). In contrast, other evidence suggests that exposure to diverse contexts is an asset for positive youth development (Hurtado, 2005). Specifically, exposure to racial, ethnic, and cultural diversity in neighborhood and educational settings has been shown to reduce prejudicial behavior and attitudes (Pettigrew & Tropp, 2006), promote creative thinking (Gurin, Dey, Gurin, & Hurtado, 2003) and cognitive openness (Gottfredson et al., 2008), and predict perceptions of safety (Juvonen et al., 2006). Overall, the consensus seems to be that exposure to diversity in school settings better prepares students to adapt flexibly to a variety of needs and circumstances in adulthood

(Hurtado, 2005). However, health disparities research highlights the importance of considering multiple complex, overlapping factors as they converge to produce disparate outcomes (Dankwa-Mullan et al., 2010); in this light, it is possible that under-resourced and disordered school contexts may fail to provide the scaffolding needed for students to learn to adaptively respond to ecological differences presented in diverse school settings.

In addition, we suggest that school staff in under-resourced schools may lack the training and skills necessary to affirm and constructively respond to issues related to ecological discontinuity. For example, Day-Vines and Day-Hairston (2005) describe urban Black males' needs to address survival-driven codes among their peers that have emerged over generations in response to their historical marginalization and emasculation.

“African American male subculture...demands that its members exhibit a tough persona and deny personal vulnerability. Any expression of human frailty or a desire to achieve academically and engage in prosocial behaviors may engender ridicule, ostracism, and humiliation from the peer group. In the absence of a psychologically safe environment that permits the expression of personal angst and vulnerability, many adolescents outwardly exude a false bravado yet inwardly harbor feelings of self-doubt, insecurity, fear, and internal strife that lead to self-defeating and self-destructive behaviors” (Day-Vines & Day-Hairston, 2005, p. 238).

When school staff lack awareness of historical and ongoing ecological discontinuities within U.S. society, and its repercussions on the day-to-day lives of their students such as is described above, staff may communicate disrespect and lack of sensitivity to students'

underlying needs and perspectives. Students may come to mistrust staff as a result, which in turn may propel a vicious cycle of problematic staff-student interactions (Gregory & Weinstein, 2008; Gregory & Ripski, 2008; Skinner & Pitzer, 2012). Qualitative and quantitative research suggests that some teachers, possibly as a result of these reciprocal processes, have developed maladaptive and deficit-oriented stances towards Black students (McKenzie & Scheurich, 2004; Neal, McCray, Webb-Johnson, & Bridgest, 2003; Skiba et al., 2008), further contributing to ecological discontinuity within schools and detracting from students' experiences of equitable and supportive school climate.

Cultural discontinuity. In addition to *ecological discontinuity*, a *cultural discontinuity* framework has also been formulated in the research on differential student engagement (Bingham & Okagaki, 2012). This model suggests that “specific differences (e.g., language, behavioral norms) between minority ethnic and mainstream cultural values and practices” may interfere with students' engagement (Bingham & Okagaki, 2012, p. 67). The suggestion is that unbridged cultural differences eventuate problems.

The literature on the role of culture in education provides some insight into this theory. Culture has been defined in this literature as:

“the lens through which we view the world; it includes shared values, beliefs, perceptions, ideals, and assumptions about life that guide specific behavior.

While this worldview is likely to be modified by our own personalities, experiences, education, and other factors, it is nevertheless the context in which certain values, behaviors, and ideas will be reinforced, while others are rejected” (García & Dominguez, 1997, p. 105).

This definition highlights an ethnocentric assumption or theory of a shared moral lens (values and beliefs). In the context of differential student engagement, this ethnocentrism, coupled with the vast heterogeneity within and between groups, may create difficulties for schools and school staff to initially recognize and respond to students in culturally appropriate ways. Especially in under-resourced schools, teachers may be stressed in ways that interfere with the metacognitive attention to culture that researchers suggest may be needed to adapt responsively and appropriately in culturally diverse contexts (Ang et al., 2007; Dray & Wisneski, 2011).

Summary. Demographic shifts place Black and Latino students in the majority in the U.S. urban student population (63%; Sable, Plotts, & Mitchell, 2010), yet the vast majority of the teaching force is White and female (Zumwalt & Craig, 2005). Thus, it is possible that undeveloped skills among school staff in recognizing and bridging cultural and ecological gaps could partially explain persistent racial disparities in school settings. Lack of cultural-ecological understanding and responsiveness may inhibit students' experience of caring, trusting and respectful relationships with school staff. The education literature on cultural responsiveness suggests that these staff shortcomings may particularly impede school engagement among students of color (Ladson-Billings et al., 1995), for whom caring relationships are considered a "pedagogical necessity" (Gay, 2002, p. 109). Gay defines the type of caring needed as *culturally responsive caring*, stating that "teachers have to care so much about ethnically diverse students and their achievement that they accept nothing less than high-level success from them and work diligently [with them] to accomplish it," (Gay, 2002, p. 109). In the absence of school support for the development of culturally responsive and sustaining practices, it is likely

that cultural differences between teachers and students will remain unbridged, resulting in continued disengagement (Bingham & Okagaki, 2012).

Public Health Significance

Research suggests that student engagement is a promising target for public health intervention (Resnick et al., 1998). Perhaps the greatest concentration of engagement research has focused on the potential of student engagement to promote positive developmental outcomes (Christenson, Reschly, & Wylie, 2012; Shernoff, 2012).

Specifically, youth engagement in school is associated with reduced rates of mental health problems (Carter, McGee, Taylor, & Williams, 2007), substance use (Finn & Rock, 1997; Gutman & Midgley, 2000; Resnick et al., 1998), conduct problems and violence (Griffiths, Lilles, Furlong, and Sidhwa, 2012; Henrich, Brookmeyer, & Shahar, 2005; Loukas, Suzuki, & Horton, 2006), and teenage pregnancy (Manlove, 1998).

Research on school connectedness, a construct related to affective engagement, has shown a significant role of positive classroom management climates and tolerant disciplinary policies in promoting a sense of school belonging (McNeely, Nonnemaker, & Blum, 2002), which in turn has been shown to reduce the likelihood of engaging in risky behaviors at an early age (Resnick et al., 1998; Eccles, Early, Frasier, Belansky, & McCarthy, 1997).

Affective engagement may be a domain of greatest direct relevance to public mental health. Research shows students' close relationships with adults in their school to be associated with improved social–emotional functioning (Appleton, Christenson, & Furlong, 2008; Rice, Kang, Weaver, & Howell, 2008) and decreases in delinquency (Brookmeyer, Fanti, & Henrich, 2006; Resnick et al., 1998; Rice et al., 2008) and

problem behaviors (Finn & Rock, 1997; Gutman & Midgley, 2000). On the other hand, disengaged students relative to their engaged peers are more likely to show conduct problems and violate school rules (e.g., by engaging in physical fights), which can lead to exclusionary discipline consequences such as school suspension and further disengagement (Carter et al., 2007; Fredricks et al., 2004).

Research also demonstrates the positive link between student engagement and academic achievement (Anderman, 2002; Crosnoe, Mistry, & Elder, 2002; Fredricks et al., 2004; NRC, 2004). A large body of research suggests that student disengagement is a critical precursor of school failure and school drop-out (Alexander, Entwisle, & Kabbani, 2001; Dalton et al., 2009; Perry, 2008). For example, in a study of 13,300 students ages 12 to 16, the risk of school drop-out among students identified with negative or inconsistent school engagement patterns was between 10 and 80 times that of peers with typical school engagement patterns (Janosz et al., 2008).

Given the consistency of findings suggesting the influence of student engagement across a multitude of youth outcomes, some researchers have theorized that greater disengagement among certain racial/ethnic groups (e.g., African American, Native American, Latino) may underlie disparities in school settings (e.g., Connell et al., 1994; Steele, 1997). Unfortunately, a distressing pattern of unequal treatment and disparate outcomes in U.S. schools by race/ethnicity is well-documented (Artiles et al., 2010; Brooks-Gunn, Rouse, & McLanahan, 2007; Skiba et al., 2011). Specifically, discrepant school practices have been observed in the research on school discipline and special education placement (Artiles et al., 2010; Skiba et al., 2011). Disproportionality in special education placement (e.g., in categories including mental retardation and severe

emotional disturbance) has been consistently observed (Donovan & Cross, 2002). Likewise, the disproportionate suspension and expulsion of Black, Latino, and Native American students, otherwise referred to as the discipline gap, has been gaining increasing research attention (Gregory, Skiba, & Noguera, 2010). In particular, the disproportionate disciplining of Black students has been observed across multiple levels of school discipline, including office disciplinary referrals (Bradshaw, Mitchell, O'Brennan, & Leaf, 2010; Skiba et al., 2011; Skiba et al., 2008), suspensions (Krezmien, Leone, & Achilles, 2006; Raffaele Mendez & Knoff, 2003), and expulsions (Wallace, Goodkind, Wallace, & Bachman, 2008). While overrepresentation of Latino students has been found in some studies (Raffaele Mendez & Knoff, 2003; Skiba et al., 2011), this finding has been more equivocal (Gordon, Della Piana, & Keleher, 2000; Skiba et al., 2000; Skiba & Rausch, 2006). This may be due to a shift from underrepresentation in disciplinary data in elementary school to overrepresentation in middle school among Latino students (Skiba et al., 2011). Other research has found that American Indian/Alaska Native students with disabilities were over-represented in exclusionary discipline (Vincent, Sprague, & Tobin, 2012).

Similarly, empirical research utilizing national and local data have consistently found racial gaps in academic performance (Perie & Moran, 2004) and discrepancies in educational attainment (National Center for Education Statistics, 2011; Wald & Losen, 2007). Often referred to as the achievement gap, findings on disparities in student academic outcomes by race and ethnicity has prompted national policy efforts over a number of years, including changes in accountability provisions under *No Child Left Behind (NCLB)* to close the racial and ethnic achievement gap; incentives in the Obama

administration's Race to the Top program (Martin & Lázaro, 2011); and most recently the Obama administration's My Brother's Keeper initiative, which aims to build 'ladders of opportunity' for men and boys of color through collaborative investments with businesses and foundations (Jarrett & Johnson, February 2014). Decreased time spent in the classroom learning environment as a result of disproportionate disciplinary exclusion in turn further amplifies disparities in student outcomes (Gregory et al., 2010). Empirical research supports this hypothesis, as suspensions and expulsions are strong predictors of dropout and delayed graduation (Bradshaw, O'Brennan, & McNeely, 2008).

A health disparities perspective (Dankwa-Mullan et al., 2010) highlights that these gaps contribute to health and economic disparities over the life course. Academic failure and school drop-out are well-documented determinants of adult health outcomes (Harper & Lynch, 2007; Vernez, Krop, & Rydell, 1999). Furthermore, exclusionary discipline has been linked with increased contact with the juvenile justice system (Fabelo et al., 2011) and behavior problems, including subsequent increases in the intensity and frequency of antisocial behavior (Mayer, 2001, Mayer & Butterworth, 1979; Mayer, Butterworth, Nafpaktitis & Sulzer-Azaroff, 1983). Some researchers also have argued the idea of a *school-to-prison pipeline*, in which exclusionary discipline practices disproportionately estrange Black males from the learning process by deterring them from the classroom and tracking them into the criminal justice system (Alexander, 2010; Darensbourg, Perez, & Blake, 2010; Skiba et al., 2002; Wald & Losen, 2007).

Because historically marginalized students are likely to recognize inequities in the school environment as racial discrimination (Ruck & Wortley, 2002; Sheets, 1996), they may be at even greater risk for additional negative outcomes. Previous research has

linked perceived racial or ethnic discrimination with negative psychological outcomes (Green, Way, & Pahl, 2006), including post traumatic stress symptoms (Wei et al., 2012), reduced self-esteem (Zeiders, Umaña-Taylor, & Derlan, 2012), depression (Ying et al., 2006), illicit substance use (Brody, Kogan, & Chen, 2012), and antisocial behavior (Park, Schwartz, Lee, Kim, & Rodriguez, 2012).

Overview of the Thesis

This thesis took an ecological perspective to explore theorized antecedents and consequences of inequitable school climate, employing data from multiple informants and sources, including student and staff-reported data from the Maryland Safe and Supportive Schools (MDS3) initiative (Bradshaw et al., in press), the U.S. Department of Education, Office of Civil Rights Civil Rights Data Collection (CRDC; U.S. Department of Education, Office of Civil Rights, 2013), and descriptive school-level data from the Maryland State Department of Education. Using latent variable and multilevel methods, this thesis supports an overarching theory that inequitable experiences of support, and contexts characterized by inequitable punishment and exclusion, relate to disparities in healthy developmental outcomes among Black high school aged youth. In Chapter 2, latent variable modeling was used to identify a theoretical model of inequitable school support and related engagement and social-emotional outcomes among Black and White high school students. Chapter 3 investigated staff-reported school organizational health as a contextual moderator of racial disparities in Black and White students' experience of equitable and supportive school climate utilizing hierarchical linear modeling. Chapter 4 proposed guidelines and presented a research case study to advance a dialogue on the measurement and modeling of discipline disproportionality within a theory-driven, school climate oriented conceptual framework. Chapter 5 employed multilevel modeling to examine the interaction of disproportionate disciplinary contexts with racial disparities in Black and White students' social and emotional outcomes. Chapter 6 discusses strengths and limitations of the thesis, and explores implications for intervention, theory, and future research.

Research Aims

Aim 1 | *To fit a model of inequitable school climate by examining associations between race, experiences of school support, psychological needs fulfillment, engagement, and adjustment.*

Hypothesis 1.1. Black students have lower mean scores than White students on school support, psychological needs fulfillment, affective engagement, and psychological adjustment.

Hypothesis 1.2. School support mediates racial inequalities in psychological needs fulfillment.

Hypothesis 1.3. Race moderates associations between students' psychological needs, affective engagement, and psychological adjustment, such that Black students' sense of school belonging is more strongly positively associated with affective engagement and more strongly negatively associated with psychological adjustment problems in comparison to White students.

Aim 2 | *To examine how staff-reported school organizational health and staff burnout influence racial inequalities in students' experiences of caring, equity, and engagement.*

Hypothesis 2.1. Black youth report experiencing caring, equitable treatment, and engagement at lower levels than White youth, and these gaps persist even after controlling for both student- and school-level confounders.

Hypothesis 2.2. Student-report of equity, caring, and engagement is positively associated with staff-reported school organizational health and negatively associated with staff-reported burnout among both Black and White students.

Hypothesis 2.3. School organizational health is associated with smaller racial gaps in students whereas staff burnout is associated with greater racial inequalities in students' experience of caring, equitable treatment, and engagement at school.

Aim 3 | *To explore methods of measuring discipline disproportionality and present a theoretical framework and research case illustration to advance more theoretically-driven quantitative research on the antecedents and consequences of the discipline gap.*

Hypothesis 3.1. Schools can be characterized by their degree of discipline disproportionality using both risk and composition indices.

Hypothesis 3.2. Using White students as a benchmark creates more measurement consistency across studies than using variable benchmarks (e.g., all other students).

Hypothesis 3.3. Disproportionate disciplinary contexts are negatively associated with students' perceptions of school equity.

Aim 4 | *To examine whether disproportionate disciplinary contexts are associated with greater racial inequalities in several key indicators of social and emotional wellbeing.*

Hypothesis 4.1. Disproportionate disciplinary contexts are associated with greater racial inequalities in several key indicators of social and emotional wellbeing.

Data Sources

The Maryland Safe and Supportive Schools (MDS3) Initiative. Data for this thesis research came from 58 high schools participating in MDS3, an initiative launched to develop a sustainable statewide system to measure school climate, the school environment, student engagement, and school safety. The research project (PI: C. Bradshaw) is funded by the U.S. Department of Education's Safe and Supportive Schools Initiative, one of the agency's largest and most comprehensive efforts to improve the climate of high schools (U.S. Department of Education, 2010). Schools in 12 Maryland school districts were invited to participate on a voluntary basis by the Maryland State Department of Education (MSDE) in conjunction with partners from Johns Hopkins University and Sheppard Pratt Health System. District-level meetings were held to establish school commitment to the project. High schools (grades 9-12) were enrolled in the project in two consecutive cohorts, with 52 schools enrolling in spring 2011, and 6 schools in spring 2012; the schools' involvement in the project will end in summer 2014 and 2015, respectively.

The U.S. Department of Education, Office of Civil Rights, Civil Rights Data Collection (CRDC; U.S. Department of Education, Office of Civil Rights, 2013). School discipline data from the CRDC includes national student count data disaggregated by race and ethnicity, disability status, and gender on a number of disciplinary outcomes for the 2009-10 school year. For our purposes, count data of students with one or more out-of-school suspensions were drawn for the 58 schools in the MDS3 and then aggregated by gender and disability status to calculate various measures of disproportionate discipline (relative risk and composition indicators) for Black relative to White students.

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Chapter 2
Racial Inequality in Black and White High School Students'
Experience of School Support
(Manuscript 1)

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Abstract

School contexts in which adults provide equitable treatment, caring, and high expectations have been recognized as essential to the healthy development of young people. Supportive relationships at school are theorized to motivate engagement and psychological wellbeing by meeting students’ needs for belonging, competence, and autonomy. This study employed structural equation modeling to examine racial differences in students’ experience of school support, psychological needs fulfillment, and student engagement. Participants were 22,057 students in 58 Maryland high schools. Results suggested that Black students experienced less teacher caring and less equitable treatment, which was linked with lower levels of perceived belonging at school relative to White students. Perceived belonging, in turn, was associated with increased engagement and decreased externalizing behaviors more so for Black than White students. Implications for professional development and future research are discussed.

Racial Inequality in Black and White High School Students'

Experience of School Support

Racial disparities between Black students and their White peers in academic and disciplinary outcomes are among the most pressing concerns facing U.S. schools (Gregory, Skiba, & Noguera, 2010) and are drawing increasing policy and research attention (Advancement Project, 2010; Fabelo et al., 2011). Numerous studies have documented more negative academic, disciplinary, and mental health outcomes for Black compared with White students (e.g., Aud et al., 2012; Latzman et al., 2011; Skiba et al., 2011). Although there is research examining contributing factors to the Black-White achievement gap (e.g., family wealth, Yeung & Conley, 2008; teacher perceptions, Ferguson, 2003), relatively little research has explored the underlying dynamics of the discipline gap, or the role of students' differential experience of the school social context (Gregory & Ripski, 2008). Greater research attention to this pathway may inform school strategies to eliminate racial disparities in student outcomes.

One promising avenue of research to explain differential outcomes is disparate student experience of school support. School support is an emerging construct theorized to contribute to both academic and psychological outcomes (Hanson & Kim, 2007). Research indicates that supportive relationships at school predict students' academic engagement and social-emotional well-being (Roeser, Eccles, & Sameroff, 2000), particularly for behaviorally at-risk Black youth (Decker, Dona, & Christenson, 2007). Studies also suggest that Black youth may be less likely to experience support from adults at school than their White peers (Hughes & Kwok, 2007).

Two conceptual models—the Dynamic Model of Motivational Development of Engagement (Skinner & Pitzer, 2012) and the Youth Development and Resiliency model (Benard, 2004; Hanson & Kim, 2007)—provide a theoretical framework to examine how students’ experience of school support may be linked with student outcomes. These models frame psychological needs fulfillment as a mediator in the association between school support and student engagement. Building on both models, this study explored the extent to which students’ subjective experience of school support varies by race; whether experience of school support mediates racial differences in psychological needs fulfillment; and whether race moderates associations between student psychological needs and dimensions of student engagement (see Figure 2.1.). This line of research has important implications for addressing disparities in educational and behavioral outcomes among high school students.

A Motivational Conceptualization of Engagement

Research has honed in on the important role of supportive school contexts in motivating student engagement (Eccles, Early, Frasier, Belansky, & McCarthy, 1997; Wang & Eccles, 2012). Motivational models conceptualize engagement as a dynamic process driven in part by reciprocal interactions of students within their school social context (Skinner & Pitzer, 2012). The Dynamic Model of Motivational Development of Engagement clarifies this process by distinguishing between engagement *facilitators*, *indicators*, and *outcomes* (Skinner & Pitzer, 2012). *Facilitators* are understood as explanatory causal factors operating outside the engagement construct. Specifically, school supportive relationships reflect external, contextual facilitators of engagement in the model, which are theorized to fulfill internal, individual engagement facilitators (i.e.,

student psychological needs; see Figure 2.1.). Engagement *indicators*, in turn, are the action components of the model, and refer to “goal-directed, emotion-infused” (p. 24) actions that can reflect behavioral, affective, or cognitive dimensions of engagement. Last, engagement *outcomes* are the results that engagement can produce (e.g., academic performance, school completion, mental and behavioral health). Theorized associations between facilitators, indicators, and outcomes are described below.

School support (external facilitators). Research has identified two dimensions of school support—*teacher caring* and *high expectations*—as essential to youth social-emotional and school outcomes (Baker, Grant, & Morlock, 2008; Benard, 2004; Furrer & Skinner, 2003; Gregory & Weinstein, 2008; Hanson & Kim, 2007; Hughes, Luo, Kwok, & Lloyd, 2008). Teacher *caring* refers to teachers’ warmth and regard for students as individuals, and is theorized to promote students’ sense of *belonging* at school (see Figure 2.1.). The dimension of *high expectations* refers to structured support for students’ standard of academic effort, and is theorized to promote academic *competence*. Theory suggests that supportive school contexts encourage positive outcomes by fulfilling students’ psychological needs (Skinner & Pitzer, 2012). Unfortunately, efforts to identify threats to student engagement have relied too heavily on student risk factors and tended to overlook the important role of school context (Finn & Zimmer, 2012) or person-context fit (Byrd & Chavous, 2011).

Student psychological needs (internal facilitators). Theories of motivation (e.g., Connell & Wellborn, 1991) and self-determination (Deci & Ryan, 2002) highlight the importance of psychological needs fulfillment in the areas of *belonging*, *competence*, and *autonomy*, and are the basis of the Dynamic Model of Motivational Development of

Engagement (Skinner & Pitzer, 2012). As illustrated in Figure 2.1., these three needs are theorized to shape students' affective engagement and related outcomes. *Belonging* (or relatedness) is a need for connection, acceptance, and inclusion and is hypothesized to underlie attachment processes (Ainsworth, 1979). *Competence* reflects a need to feel effective in one's interactions with the world, including the social and physical environment (Elliot & Dweck, 2005; White, 1959). *Autonomy* describes the need to express one's agency (i.e., the self as the source of action; Deci & Ryan, 2002). A large body of research supports the central argument of motivational theory that engagement is predicated on fulfillment of needs for autonomy, competence, and belonging (Niemiec & Ryan, 2009). Yet little research has specifically examined how needs fulfillment may facilitate affective engagement.

Affective engagement (indicator). Affective engagement is considered an important driver of behavioral engagement and psychological outcomes (Finn & Zimmer, 2012; Maddox & Prinz, 2003). Theory suggests that when student psychological needs are fulfilled in supportive learning environments, students engage productively at school (Niemiec & Ryan, 2009); however, when psychological needs go unmet, students become disaffected and exhibit poor social-emotional functioning, including internalizing and externalizing behaviors (Skinner, Furrer, Marchand, & Kindermann, 2008). In fact, disaffection and disengagement in school have been associated with mental health problems (Carter, McGee, Taylor, & Williams, 2007), conduct problems and violence (Griffiths, Lilles, Furlong, & Sidhwa, 2012), and school failure and school drop-out (Dalton et al., 2009). Because affective engagement is likely to be an important precursor to behavioral engagement and psychological outcomes, it is critical to hone in

on the role of school support and student psychological needs fulfillment in the motivation of affective engagement.

Integrating Race and Racial Inequity

Although models of school support and engagement motivation are well supported by research, these models tend to neglect the role of race and racial inequity in schools, influences that have potential to distinctly explain disparate school outcomes among Black and White youth. Race is viewed in this study as a historically determined, self-reinforcing social construct (Ogbu, 2004) and a social position variable reflective of the social stratification system in U.S. society. In particular, race is considered a proxy for potential exposure to societal, institutional, and individual bias. This study integrates several considerations, described below, which reflect the potential influence of race in shaping students' experiences at school.

Equitable treatment and cultural inclusion: A dimension of school support.

Evidence suggests that students' perceptions of differential treatment and discrimination by teachers and other adults in school play a role in poor outcomes among youth of color in school. Perceived discrimination is negatively associated with mental health outcomes, including antisocial behavior (Bogart et al., 2013), depression, and reduced self-esteem (Zeiders, Umaña-Taylor, & Derlan, 2012). Findings on the association between perceived discrimination and student engagement are less clear-cut however, and have varied across racial and ethnic groups, school settings, gender, age, racial and ethnic identity, and bicultural identity and self-efficacy (Bingham & Okagaki, 2012). Specifically, a number of studies have found that perceived discrimination was negatively linked to Black students' valuing of education and academic persistence (e.g., Dotterer et

al., 2009; Smalls, White, Chavous, & Sellers, 2007; Wong, Eccles, & Sameroff, 2003), whereas other studies have found positive associations among American Indians' with perceived instrumental importance of school (Okagaki, Helling, & Bingham, 2009). Findings have also varied by school context (i.e., more consistent negative associations with education valuing and behavioral engagement in public school settings than in Catholic schools, Taylor et al., 1994) and gender (i.e., such that Black girls' academic self-efficacy was negatively associated with perceived discrimination where Black boys' academic self-efficacy was not; Oyserman, Harrison, and Bybee, 2001). However, the overall trend suggests a negative association between perceived discrimination and engagement among Black youth. On the other hand, research on school climate suggests that a school culture of equitable treatment and cultural inclusiveness may positively influence students' sense of connectedness and academic motivation in school (Debnam, Lindstrom Johnson, Waasdorp, & Bradshaw, in press). Adolescents' perceptions of fairness in the school environment can enhance both students' sense of competence (Elliot & Dweck, 2005) and connectedness (Lowman, 1984). Existing conceptualizations of school support (i.e., in the Dynamic Model of Motivational Development [Skinner & Pitzer, 2012] and the Youth Development and Resiliency model [Hanson & Kim, 2007]) do not include dimensions reflecting students' perceptions of equitable treatment and cultural inclusiveness.

Racial disparities in school support. Although school support is linked with a sense of belonging across diverse racial and ethnic groups (e.g., García-Reid, Reid & Peterson, 2005; Tyler & Boelter, 2008), positive relationships with teachers may be particularly important for Black youth (Decker et al., 2007) and Black youth with

behavior problems (Meehan, Hughes, & Cavell, 2003). Black and other historically marginalized students may benefit from teacher support to navigate sociocultural boundaries between school, home, and neighborhood (Gay, 2002) and to cope with experiences of discrimination at school (García-Reid, 2007). In addition, research has found that caring, supportive teacher relationships and classroom climates had more salient benefits than other social contextual factors for positive school experiences among an urban, predominantly Black student sample (Baker, 1998). Unfortunately, research also suggests that Black students are less likely to experience supportive relationships with their teachers than their White peers (Hamre & Pianta, 2001; Hughes & Kwok, 2007). More research is needed that directly examines the mediating role of school support in the relationship between race and student psychological needs fulfillment.

Unique processes motivating affective engagement and psychological adjustment. An important critique of the developmental research on children of color is that there is a lack of understanding of *processes* that lead to disparate outcomes in Black versus White youth (García Coll et al., 1996). For example, more work is needed to understand how race may moderate the ways in which students' experiences at school influence affective engagement and psychological processes (Eccles & Roeser, 2011; García Coll et al., 1996). Particularly since there is some indication that Black youth experience disparately high rates of internalizing problems (e.g., sad mood, anxiety, suicidal ideation) and externalizing problems (e.g., aggression, hyperactivity) relative to White youth (Eaton et al., 2008; Skiba, Poloni-Staudinger, Gallini, Simmons, & Feggins-Azziz, 2006), it is important to understand how developmental processes differ between Black and White youth in ways that may contribute to these disparities. However, little

extant research has directly examined whether there is unique variation by race in how psychological needs fulfillment motivates engagement and psychological adjustment in school.

The Current Study

Although many studies have documented disparities in student indicators of engagement and psychological adjustment, few have examined underlying processes related to race and racial inequity in schools. More inclusive models addressing racial differences are necessary to further our understanding of the development of young people of color (García Coll et al., 1996). This study addressed this gap by assessing school equity and cultural inclusion as a dimension of school support and by examining racial differences in perceived school support and its associations with psychological and academic functioning. We utilized cross-sectional, self-report data from 22,057 Black and White students at 58 Maryland high schools to assess the following hypotheses: 1) Black students have lower mean scores than White students on school support, psychological needs fulfillment, affective engagement, and psychological adjustment; 2) school support mediates the association between race and psychological needs fulfillment; and 3) race moderates associations between students' psychological needs, affective engagement, and psychological adjustment, such that Black students' fulfilled sense of belonging is more strongly positively associated with affective engagement and more strongly negatively associated with psychological adjustment problems in comparison to White students.

Method

Sample

Data for this study come from students attending 58 high schools participating in the Maryland Safe and Supportive Schools Initiative (MDS3), a statewide initiative focused on school climate, student engagement, and school safety. The cross-sectional data were collected from adolescents in grades 9-12 via a web-based survey administered in spring 2012. Analyzed data were limited to Black ($N=8,707$) and White ($N=13,349$) adolescents only, totaling 22,057 students in an average of 25.31 classrooms per school. The sample is 50.6% male and 49.4% female, with mean age 15.93 ($SD=1.27$). Demographic characteristics are presented in Table 2.1.

Procedure

High schools were invited to participate in MDS3 on a voluntary basis. Districts were approached by the Maryland State Department of Education (MSDE) in order of perceived need. Anonymous data were collected via a passive parental permission process and youth assent process. All student participation was voluntary. The survey was administered online in language arts classrooms to approximately 25 classrooms per school, with an approximate distribution as follows: seven 9th grade classrooms and six each of 10th, 11th, and 12th grade classrooms. School staff administered the survey following a written protocol. The researchers' Institutional Review Board approved analysis of these data.

Measures

The constructs described below were hypothesized based on theory and measured using items from the MDS³ Student Survey. A collaborative led by the Johns Hopkins

Center for Youth Violence Prevention developed the survey. For additional details, see Bradshaw, Waasdorp, Debnam, & Lindstrom Johnson (in press). Cronbach's alphas (α) were calculated to assess the internal consistency reliability of key constructs in the study.

Student demographic characteristics. Adolescent participants responded to a series of questions regarding sociodemographic characteristics, including age, gender, and grade-level. Participants were also asked to self-identify as either Asian/Pacific Islander, Black/African American, Hispanic/Latino, Native American/American Indian, Native Hawaiian, White/Caucasian, or Other (Ensminger et al., 2000).

School support. Twelve survey items were given on a four-point Likert scale and were adapted from the California Healthy Kids Survey (2010; Hanson & Kim, 2007) and the School Development School Climate Survey (Haynes et al., 2001).

Psychometrics are reported in the Preliminary Analyses section.

Student psychological needs. Eight survey items were given on a four-point Likert scale and were adapted from the National Longitudinal Study on Adolescent Health (Resnick et al., 1997), the School Development School Climate Survey (Haynes et al., 2001), and the California Healthy Kids Survey (Hanson & Kim, 2007).

Psychometrics are reported in the Preliminary Analyses section.

Affective engagement. Our measure of engagement focused on the affective engagement subtype. The three survey items ($\alpha=.84$; i.e., "I like coming to school", "I enjoy learning at this school", "I like this school") were adapted from the California Healthy Kids Survey (Hanson & Kim, 2007) and the School Development School

Climate Survey (Haynes et al., 2001), which were measured on a four-point Likert scale from almost always (4) to never (1).

Psychological adjustment. Five items measure frequency of student's *internalizing problems* ($\alpha=.84$; e.g., "I feel depressed", "I feel nervous or anxious", "I am sad"). Four items measure frequency of a student's externalizing problems ($\alpha=.81$; e.g., "I get mad easily", "I do things without thinking", "I have trouble controlling my temper"). Items were adapted from the Behavior Assessment System for Children, 2nd edition (BASC-2; Reynolds & Kamphaus, 2004) and measured on a four-point Likert scale from almost always (4) to never (1).

Physical fights. One item assessed the frequency of the student's aggressive behavior at school (i.e., "During the past 12 months, how many times were you in a physical fight on school property?" The following response options are provided: 0 times (1); 1 time (2); 2 or 3 times (3); 4 or 5 times (4); 6 or 7 times (5); 8 or 9 times (6); 10 or 11 times (7); 12 or more times (8). This item was adapted from the Youth Risk Behavior Surveillance Survey (YRBS; CDC, 2010).

Truancy. One item assesses the frequency of truancy: (1) "During the last month, how many days of school have you missed because you skipped or 'cut'?" The following response options are provided: 0 days (1); 1 day (2); 2 or 3 days (3); 4 or 5 days (4); 6 or more days (5). This item was adapted from the Communities that Care Youth Survey (Arthur, Hawkins, Pollard, Catalano, & Baglioni, 2002) and the YRBS (CDC, 2010).

Poor grades. One survey question was used to determine student-level academic performance (i.e., "On your last report card, you earned..." with the following response

options provided: Mostly A's [1], Mostly B's [2], Mostly C's [3], Mostly D's [4], Mostly F's [5]).

Preliminary Analyses

All data were analyzed using Stata 11 (StataCorp, 2010) and *Mplus* 7 (Muthen & Muthen, 2012). Degree of model fit was gauged by the chi-square statistic (χ^2), comparative fit index (CFI; Bentler, 1990), non-normed fit index (NNFI, also known as the Tucker-Lewis Index [TLI]; Bentler & Bonett, 1980), and the root-mean-square error of approximation (RMSEA) with 90% confidence interval (RMSEA; Steiger & Lind, 1980). Adequate model fit was determined by chi-square test insignificance $>.05$, CFI $>.90$, TLI $>.90$, and RMSEA $<.06$. With large sample sizes, the chi-square test is known to be sensitive (Marsh, Balla, & McDonald, 1988). Alternative fit indices based on principals of parsimony (i.e., RMSEA) were therefore referenced to make decisions regarding competing models (Browne & Cudeck, 1992).

School support factor analyses. An exploratory factor analysis (EFA) in *Stata* using principal components analysis with orthogonal rotation of twelve items based on $N=17,960$ students, $J=52$ schools from the Year 1 survey administration yielded a three-factor solution that accounted for 69.9% of the variance. The three factors were *caring* (4 items, $\alpha=.85$; items: “My teachers care about me”, “My teachers listen when I have something to say”, “Students trust the teachers”, “Teachers respect the students”), *high expectations* (4 items, $\alpha=.87$; items: “My teachers encourage me to work hard in my classes”, “My teachers believe that I can do well in school”, “My teachers always want me to do my best”, “Teachers believe all students can do well if they try”), and *equitable treatment and cultural inclusion* (4 items $\alpha=.83$; items: “The school provides

instructional materials that reflect my culture” and “At this school, students of all races [whether boys or girls, whether parents are rich or poor] are treated the same). A multiple group confirmatory factor analysis (CFA) in *Mplus* utilizing WLSMV estimation (i.e., all items treated as categorical) and sample weights with this study sample grouped by race found that a three factor model provided adequate fit to the data, $\chi^2(51) = 1669.47, p < .001$, CFI = .99, TLI = .99, RMSEA = .03 (.032-.035).

Student psychological needs factor analyses. An EFA of eight items in *Stata* using principal components analysis with orthogonal rotation based on $N=17,960$ students, $J=52$ schools from the Year 1 survey administration suggested a three-factor solution: *belonging* (3 items, $\alpha=.79$; items: “At this school, I feel like I belong”, “I feel close to people”, “I feel like I am part of this school”), *competence* (2 items, $\alpha=.62$; items: “I believe I can do well in school”, “It is important to finish high school”), and *autonomy* (3 items, $\alpha=.74$; items: “At school, I help decide things like class activities or rules”, “I do things that make a difference”, “I do interesting activities”). A multiple group three-factor CFA utilizing WLSMV estimation (i.e., all items treated as categorical) and sample weights with this study sample grouped by race provided adequate fit to the data, $\chi^2(17) = 1599.23, p < .001$, CFI = .96, TLI=.96, RMSEA = .05 (.051-.055).

Measurement invariance. Prior to making group comparisons, measurement invariance of the factor structure for the overarching model between Black and White student groups was assessed in a series of configural, metric, and scalar models (Meredith, 1993) utilizing multiple group CFA in *Mplus* with WLSMV estimation (all items were treated as categorical). Measurement invariance is demonstrated when a) the

multi-group model demonstrates an adequate fit to the data and b) when differences in CFI between models are less than .01 (Cheung & Rensvold, 2002). Configural model fit indices suggested good fit of the theorized factor structure overall, $\chi^2 (856) = 7756.67$, $p < .001$, CFI = .98, TLI = .97, RMSEA = .03 (CI: .027-.028). With the exception of the chi-square test, all of the remaining criteria were met in this test of measurement invariance. Comparing metric against configural models, $\chi^2 = 243.43$ (df = 23), $p < .001$, $\Delta\text{CFI} = .001$, $\Delta\text{TLI} = .001$, $\Delta\text{RMSEA} = < .001$. Comparing scalar against configural models, $\chi^2 = 698.53$ (df = 78), $p < .001$, $\Delta\text{CFI} = .001$, $\Delta\text{TLI} = .002$, $\Delta\text{RMSEA} = .001$.

Missing data. An examination on the entire sample of the patterns of missing data indicated missingness by race/ethnicity, age, and gender; however, there was limited evidence that the mechanism of missingness was problematic. After limiting the student sample to those who provided adequate initial demographic information (race, age, gender, and maternal education), descriptive analyses found very little missing outcome data (<1% of students were missing items). As a result, the analyses assumed data was missing at random (MAR) such that the reason for missingness was assumed to be unrelated to the missing value itself, or was judged to be random after adjusting for observed covariates (Rubin, 1976). *Mplus* software adjusts for missingness using full-information maximum-likelihood (FIML) estimation, which is widely recognized as an appropriate means of handling missing data assumed to be MAR (Shafer & Graham, 2002). The sample was weighted to represent the school-wide population using the raking method (Battaglia, Izreal, Hoaglin, & Frankel, 2013; see Bradshaw et al., in press). Sample weights were utilized in the analysis for Hypothesis 1, which examined mean differences, but not for the structural models in Hypotheses 2-3.

To test hypotheses 2 and 3, structural equation modeling (SEM) was employed (Bollen, 1989; Kline, 2011). To account for the dependency between observations (students) within clusters (schools), analyses were conducted using the complex analysis feature in Mplus 7.11 (Muthén & Muthén, 1998-2012). SEM utilized maximum likelihood estimation with robust standard errors (MLR; Muthén & Muthén, 1998-2012), which accounts for the nested structure of the data by adjusting the standard errors of the estimated coefficients. The degree of model fit was assessed by goodness of fit criteria previously described, as well as the standardized root mean square residual (SRMR; $<.08$; Hu & Bentler, 1999). Covariates initially controlled in the models in hypotheses 2 and 3 included intervention condition, grade-level, and gender.

Results

Hypothesis 1: Mean Differences

Table 2.2. presents mean differences and accompanying test statistics to document disparities in students' reports of school support, psychological needs fulfillment, affective engagement, and psychological adjustment among Black relative to White youth. As hypothesized, mean scores were significantly lower for Black students' experiences of teacher caring ($\Delta = -.15$, $t = -16.13$, $p < .001$), equitable treatment and cultural inclusion ($\Delta = -.08$, $t = -8.03$, $p < .001$), belonging ($\Delta = -.10$, $t = -9.45$, $p < .001$), and affective engagement ($\Delta = -.12$, $t = -10.71$, $p < .001$) relative to White students. Also as hypothesized, mean scores for externalizing problems ($\Delta = -.15$, $t = -16.13$, $p < .001$), poor grades ($\Delta = .39$, $t = 30.97$, $p < .001$), and physical fights were higher ($\Delta = .12$, $t = 11.15$, $p < .001$) for Black students than White. However, contrary to our expectations, mean scores were lower for internalizing problems ($\Delta = -.12$, $t = -12.29$, $p < .001$), and mean

scores of experience of competence were significantly higher ($\Delta = .08$, $t = 10.18$, $p < .001$) among Black relative to White youth. No significant differences were found between Black and White students for ratings of teacher high expectations, autonomy, or truancy.

Hypothesis 2: Mediation

The second hypothesis was that school support would mediate the association between race and psychological needs fulfillment. The *model indirect* feature of *Mplus* was utilized to generate total, direct, and indirect effect estimates with accompanying standard errors, z-scores, and test statistics, with p -values $< .05$ indicating statistical significance. Figure 2.2. presents the mediation model and path coefficients. The model provided an adequate fit to the data, $\chi^2(191) = 4382.111$, $p < .001$, CFI = .95, TLI = .93; RMSEA = .03 (.031-.033), SRMR = .05. Significant, negative associations were found between race and students' experience of teacher caring ($\beta = -.12$, $p < .001$) as well as equity and cultural inclusion ($\beta = -.06$, $p < .001$); however, no significant association was found between race and students' experience of teacher high expectations ($\beta = -.02$, $p = .279$). Experience of teacher caring was positively associated with perceived belonging ($\beta = .59$, $p < .001$) and autonomy ($\beta = .59$, $p < .001$) at school. Experience of equity and cultural inclusion was also positively associated with perceived belonging at school ($\beta = .15$, $p < .001$). Experience of teacher high expectations was positively associated with greater perceived competence ($\beta = .71$, $p < .001$). Grade-level and gender associations were nominal and were dropped to improve model fit.

Table 2.3. presents the results of the hypothesized mediated effects, in which significant indirect effects of students' experience of teacher caring explained differences by race in students' sense of belonging ($\alpha\beta = -.068$, $Z = -6.650$, $p < .001$) and autonomy

($\alpha\beta = -.068$, $Z = -6.737$, $p < .001$) at school. Significant indirect effects of students' experience of equity and inclusion in the association of race and students' sense of belonging were also found ($\alpha\beta = -.01$, $Z = -2.932$, $p < .005$). Perceived high expectations did not have significant indirect effects in the association between race and students' sense of competence ($\alpha\beta = -.01$, $Z = -1.082$, $p = .278$).

Hypothesis 3: Moderation by Race

The third hypothesis of this study was that race would moderate the structural model overall, and particularly, the associations between student psychological needs fulfillment and student functioning. This hypothesis was tested using the grouping and model test features of *Mplus*. Specifically, path coefficients, standard errors, and test statistics were estimated separately for Black and White youth, and then differences were tested using a Wald test of parameter constraints to equality. The Wald test produced test statistics and accompanying p -values that allowed conclusions to be drawn about the difference in the path coefficients.

The overarching model, presented in Figure 2.1., required certain specifications to improve fit. Specifically, students' sense of autonomy was strongly linked with student engagement, but weakly associated with psychological adjustment. Removing links of autonomy to psychological adjustment improved model fit. The resulting model tested moderation by race (see Figure 2.3.). The model provided an adequate fit to the data, $\chi^2(498) = 11902.34$, $p < .001$, CFI = .91, TLI = .91, RMSEA = .05 (CI: .045-.046), SRMR = .05. All path coefficients in Figure 2.3. were significant at the $p < .001$ level. The findings support our proposed model of school support for student psychological needs, in which fulfillment of psychological needs is associated with student affective engagement at

school and healthy psychological adjustment. An omnibus test imposing parameter constraints to equality on all structural path coefficients in Figure 2.3. indicated the structural model differed significantly by race (Wald $\chi^2=242.37$, $df=11$, $p<.001$).

The results of tests of moderation by race for specific path coefficients, presented in Table 2.4., showed that the magnitude of associations between psychological needs fulfillment, affective engagement, and psychological adjustment varied significantly by race. Specifically, as *internalizing symptoms* increased, White students' sense of *belonging* more steeply declined than Blacks' (Wald $\chi^2=76.70$, $p<.001$), whereas Black students' sense of *competence* more steeply declined than White students' (Wald $\chi^2=5.68$, $p<.05$). In contrast, as *externalizing symptoms* increased, White students' sense of *competence* more steeply declined than Black students (Wald $\chi^2=49.01$, $p<.001$), whereas Black students' sense of *belonging* more steeply declined than White students' (Wald $\chi^2=11.91$, $p<.001$). Finally, as *affective engagement* increased, White students' sense of *competence* more steeply increased than Black students' (Wald $\chi^2=42.11$, $p<.001$), whereas Black students' sense of *belonging* increased more steeply than White students' (Wald $\chi^2=22.58$, $p<.001$). No significant difference in the magnitude of association between *affective engagement* and White and Black students' perceived *autonomy* was found (Wald $\chi^2=2.50$, $p=.11$). In sum, these findings indicate that for Black students, in contrast to their White peers, a sense of belonging may be more salient for engagement and externalizing problems, whereas a sense of competence may be more relevant to internalizing problems.

Discussion

This paper examined students' engagement and psychological adjustment at school as outcomes of their experiences of school support and psychological needs fulfillment (Deci & Ryan, 2002; Skinner et al., 2008). Consistent with the Dynamic Model of Motivational Development of Engagement (Skinner & Pitzer, 2012), our findings suggest that if core student psychological needs are met by school social contexts, students will engage fruitfully with them. However, when student needs are unmet, students may either withdraw or act out. Researchers have characterized this dynamic as a "virtuous or vicious" cycle (p. 31, Skinner & Pitzer, 2012).

Our findings also lend support to the assertion that racial disparities in experience of school support partially explain the overarching differential effectiveness of schools in educating Black as compared with White students (Bingham & Okagaki, 2012; KewelRamani, Gilbertson, Fox, & Provasnik, 2007). We found that high school students experience disparate levels of school support by race, particularly in regard to perceived teacher caring and equitable, culturally inclusive treatment. Most notably, Black students' experience of teacher caring was significantly lower than White students', and significant indirect effects of students' experience of teacher caring explained differences by race in students' sense of belonging at school.

We also found that students' sense of belonging at school was more strongly positively associated with affective engagement and negatively associated with externalizing problems among Black relative to White youth. This finding is consistent with research on the importance of communalism (i.e., a cultural value of interdependence) to Black students' learning experiences (Tyler, Boykin, Boelter, &

Dillihunt, 2005). A recent comprehensive review of the school as a developmental context during adolescence concluded that “a sense of belonging may be especially critical for young people who must traverse significant ethnic and racial, socioeconomic, and sociolinguistic borders to feel fully a part of a school in which middle-class, majority cultural norms often predominate” (Eccles & Roeser, 2011, p. 229). Therefore, it is particularly unfortunate that students’ sense of belonging at school appears to be hindered by lower experience of school support. If Black students’ sense of belonging is more consequential to their affective engagement and externalizing problems at school, it follows that *more* support for belonging (i.e., increased teacher caring and equitable, culturally inclusive treatment) could be beneficial (Eccles & Roeser, 2011). Instead, Black students experience significantly *less* of these supports, which may create a “double jeopardy,” unduly thwarting Black students’ optimal functioning at school.

We also found differences by race with respect to internalizing symptoms, however they were not in the expected direction. Specifically, we found significantly lower mean scores on internalizing problems among Black relative to White students – whereas the opposite pattern emerged for externalizing symptoms. Hypothesis 3 analyses indicated that perceived belonging was less strongly associated with internalizing problems, whereas perceived competence was more strongly linked to internalizing symptoms, for Black relative to White students. Understanding the underlying mechanisms explaining these differences in how psychological needs fulfillment relate to psychological adjustment merits further research attention.

Findings related to students’ experience of teacher high (academic) expectations and sense of competence were also contrary to what was hypothesized. Specifically,

differences in students' experience of teacher high expectations were not found, indicating that Black and White youth perceive similar levels of high academic expectations from their teachers. Furthermore, Black students reported *higher* levels of competence while simultaneously reporting significantly lower grades than White students. Although the latter finding was consistent with our expectations, findings regarding similar levels of teacher high academic expectations and higher levels of competence among Black students contradicted our hypotheses.

On review of the literature, these unexpected findings fit within a growing body of research documenting an “engagement-achievement paradox” (Shernoff & Schmidt, 2008) among U.S. high school students. Studies suggesting an “engagement-achievement paradox” have found that Black students report *higher* levels of academic motivation and success expectancies compared to White peers (Dotterer et al., 2009; Graham, 1994; Mickelson, 1990; Shernoff & Schmidt, 2008). A number of researchers have suggested that measurement issues may underlie unexpected findings regarding academic motivation of Black students' relative to their academic outcomes (Schmidt & Shernoff, 2008). These researchers suggest that different measurement approaches may influence findings on academic motivation by race/ethnicity. Specifically, the informant (i.e., student or other-report), the dimension (i.e., affective or cognitive engagement), and the subject (i.e., appraisals of self or school/institution) of a given measure may impact the presence and directionality of discrepancies in academic motivation by race/ethnicity (Shernoff & Schmidt, 2008). In a related study examining the “engagement-achievement paradox,” student self-oriented appraisals tended to support the engagement-achievement paradox (wherein White students report lower engagement than other racial/ethnic

groups), whereas students' school-oriented appraisals tended to reflect patterns of difference found in outcomes (Shernoff & Schmidt, 2008). This is consistent with our findings. Although the school-referenced appraisal (i.e., teacher high expectations) was not higher among Black students than White students, the student-referenced appraisal (i.e., competence) was higher. Nonetheless, our findings are inconsistent with research suggesting that discrimination may lead to lowered perceptions of the value of school (Bingham & Okagaki, 2012). Overall, this finding merits further research attention, which we discuss in more depth below.

Limitations

An important limitation of this study is our reliance on cross-sectional data. As a priori theory sets hypotheses about directionality that are not directly tested with cross-sectional data, competing models must be evaluated and considered in light of current theory and prior empirical findings (DiLalla, 2000). Causal inferences about the veracity of a causal hypothesis, particularly when analyzing transactional processes, are rarely justified when using cross-sectional data. For example, it could be that students with poor engagement and psychological adjustment evoke less support from their teachers. Therefore, research with repeated measures over time is necessary to confirm the directionality of the effects theorized in this study.

An additional limitation is our reliance on student self-report data. It is often ideal to build on multiple informants' report to strengthen validity and causal hypotheses. However, this study highlights students' subjective experience (i.e., how students *feel* about their relationships at school and towards school itself), because such perceptions may be predictive of student outcomes and may be key to understanding racial

disparities. A further limitation is that three measures in the study were comprised of just one item. Yet, two of these items were drawn from the YRBS (2010), a widely accepted measure of adolescent risk. Measures utilized in large-scale survey implementation are often by necessity more limited in the number of items relative to measures utilized in experimental psychological research. Other limitations of this study were that we were unable to account for student-level socioeconomic status or school-level demographic characteristics (e.g., racial composition), or other relevant variables that influence students' perceptions of key constructs in this study, such as student-parent and student-peer relationships, as well as home school connections. Future research drawing upon the current model should include measures of these important factors.

Theoretical Implications and Future Directions for Research

Bandura's theory of reciprocal determinism has influenced school psychologists to more closely attend to the social contexts in which students' learning and behaviors occur (Bandura, 1989; Christenson & Anderson, 2002). Premised upon this theoretical foundation, mounting evidence has documented the importance of the *interaction* of students with school contexts as a developmental determinant of engagement and psychological adjustment in school settings (Eccles & Roeser, 2011). Our study findings advance this theoretical perspective in two ways. First, our research builds evidence in support of a motivational conceptualization of engagement in which the interaction of school supports with student psychological needs drives affective engagement and academic, psychological, and behavioral outcomes. Second, we examined the association between race and school support as a potential contributing factor in racial disparities in student engagement and psychological outcomes. A social-cognitive perspective on bias

suggests that people evoke different responses from their social environment by their phenotypic characteristics, including race, and by their socially conferred status (Bandura, 1999). Our findings of Black students' lower report of caring and equitable treatment suggest that Black students may be subject to social environmental biases that limit their experiences of support, which in turn may hinder the fulfillment of core psychological needs and related outcomes. Taken together, these findings suggest that an ecologically-oriented motivational model such as the one posed by Skinner and Pitzer (2012) may be appropriate for examining racial and ethnic disparities in high school students' engagement and psychological adjustment.

Because our model distinguished a number of constructs within each dimension of the model, we were able to discern specific patterns that were more salient for Black than White youth, which point to several key areas for extended theory and research. For example, we were able to distinguish caring from high expectations, belonging from competence, and internalizing from externalizing problems, and each distinction was important in that it yielded unexpected findings that may have otherwise been lost. Namely, the findings of Black youth's higher report of competence fulfillment (particularly given their lower report of academic performance) is an important area for future research to explore. It may be important to examine how concerns regarding perpetuating stereotypes may bias Black students' report on academic motivation measures. Another plausible explanation is that perceived discrimination may moderate the association between students' academic motivation and academic outcomes. In addition, research examining racial disparities in internalizing symptoms among adolescents is lacking, although some research on Black adults suggesting the rates of

Major Depressive Disorder (MDD) are lower among Blacks (10.4%) than Whites (17.9%; Williams et al., 2007) are consistent with our findings. However, this study also showed that, among those reporting MDD symptoms, Black adults were more likely to report them as severe and disabling than White adults were. This suggests that there may be between-group threshold differences for reporting internalizing symptoms (i.e., that Blacks may tend not to report internalizing problems unless they are particularly severe).

Implications for School Psychologists

Consistent with prior research, our findings highlight the importance preparing teachers to establish supportive relationships with Black youth (Meehan et al., 2003). To address this need, school psychologists may play an important role in implementing interventions designed to enhance teacher knowledge and skill in culturally responsive and sustaining classroom practices relevant for Black youth. Given that the vast majority of the teaching force is White and female (Zumwalt & Craig, 2005), while demographic shifts place Black and Latino students in the majority in the U.S. urban student population (63%; Sable, Plotts, & Mitchell, 2010), teachers may need more training to recognize and bridge cultural and ecological gaps in their relationships with students whose backgrounds differ from their own (Delpit, 2006; Ladson-Billings, 2009).

Teacher cultural responsiveness, which “builds bridges of meaningfulness between home and school experiences as well as between academic abstractions and lived sociocultural realities,” (Gay, 2000, p. 29), represents a promising strategy to interrupt cycles of student disengagement resulting from cultural discontinuities and experiences of discrimination at school. School psychologists may promote teacher cultural responsiveness through professional development trainings and one-on-one

coaching support targeted to teachers who demonstrate challenges in their relationships with Black youth (e.g., teachers who disproportionately issue office disciplinary referrals to Black youth). One professional development approach designed to improve school staff cultural responsiveness is the Double Check framework (Hershfeldt et al., 2009), which uses a CARES model to focus on concrete skills teachers can practice to enhance cultural Connections to curricula, Authentic relationships, Reflective thinking, Effective communication, and Sensitivity to student culture. Although preliminary research suggests the promise of this intervention (Bradshaw et al., 2014), more work is needed to establish its effectiveness and to determine effective dissemination strategies in partnership with school psychologists.

Conclusion

Understanding the role of perceived school support is an important research agenda within our broader efforts to identify and ultimately eliminate disparities in school settings. Individual and institutional biases, as well as unbridged cultural discontinuities, may undermine students' experience of school support, consequent engagement, and psychological adjustment in schools. These processes are likely to occur within a reciprocal feedback loop in which negative interactions with teachers lead to increased exposure to exclusionary discipline (Carter et al., 2007; Fredricks et al., 2004; Griffiths et al., 2012), which in turn may perpetuate a chain of detrimental effects on developmental outcomes (APA, 2008) among Black youth. Teacher cultural proficiency interventions to improve Black students' experience of teacher caring and equitable, culturally inclusive treatment have potential to shift this "vicious" chain of effects onto a more "virtuous" dynamic trajectory.

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Table 2.1.

Demographic Characteristics

Student Characteristics (<i>N</i> = 22,057 students)	N (%)
Gender	
Male	11,159 (50.6)
Female	10,898 (49.4)
Race/Ethnicity	
Black	8708 (39.5)
White	13349 (60.5)
Grade	
Grade 9	6121 (27.8)
Grade 10	5585 (25.3)
Grade 11	5389 (24.4)
Grade 12	4962 (22.5)

Table 2.2.

*Mean Differences of Black Relative to White Students' Experience
of School Support, Met Needs, Engagement, & Psychological Adjustment*

	<i>Overall M (SD)</i>	<i>Difference</i>	<i>t</i>	<i>p</i>	<i>T-K</i>
<i>Teacher Support</i>					
Teacher Caring	2.68 (.68)	-0.15	-16.13	<.001	22.69*
Teacher High Expectations	3.11 (.68)	-0.01	-0.66	.51	0.57
Equity & Cultural Inclusion	2.67 (.73)	-0.08	-8.03	<.001	11.30*
<i>Psychological Needs</i>					
Belonging	2.78 (.72)	-0.10	-9.45	<.001	13.47*
Competence	3.56 (.59)	0.08	10.18	<.001	15.08*
Autonomy	2.37 (.70)	0.02	1.66	.10	2.30
<i>Engagement</i>					
Affective Engagement	2.53 (.83)	-0.12	-10.71	<.001	15.12*
<i>Psychological Adjustment</i>					
Internalizing Problems	1.85 (.71)	-0.12	-12.29	<.001	17.61*
Externalizing Problems	2.07 (.79)	0.12	11.15	<.001	15.45*
<i>School Outcomes</i>					
Physical Fights	.68 (2.26)	0.25	8.07	<.001	10.55*
Poor Grades	2.03 (.93)	0.39	30.97	<.001	43.25*
Truancy	.70 (1.47)	0.00	0.00	.99	0.834

Note. T-K= Tukey-Kramer Post-Hoc Test of Multiple Comparisons. Asterisk indicates statistical significance of test of mean difference according to Tukey's probability/critical value table, accounting for appropriate df_{within} and number of groups.

Table 2.3.

Tests of Hypothesized Mediation Effects (N=21,449)

<i>Path</i>	α	<i>Path</i>	b	Mediation effect ($\alpha \times b$)	SE_{α}	SE_b	$SE_{\alpha \times b}$	$Z_{\alpha \times b}$	p (two-tailed)
Black→Equity	-.060	Equity→Belong	.152	-0.009	.020	.014	.003	-2.932	<.005
Black→Caring	-.115	Caring→Belong	.593	-0.068	.017	.014	.010	-6.650	<.001
Black→Caring	-.115	Caring→Autonomy	.594	-0.068	.017	.010	.010	-6.737	<.001
Black→HighExp	.018 [‡]	HighExp→Comp	.711	-0.013	.017	.015	.012	-1.082	.278

Note. Path coefficients are all standardized. ‡= n.s.

Table 2.4

Wald Tests of Parameter Constraints to Equality of Black Relative to White Student Groups

		Competence	<i>p</i>	Belonging	<i>p</i>	Autonomy	<i>p</i>
Internalizing	White	-.105		-.381		-	
	Black	-.189		-.197		-	
	Wald χ^2	5.68	<.05	76.70	<.001		-
Externalizing	White	-.271		-.152		-	
	Black	-.063		-.233		-	
	Wald χ^2	49.01	<.001	11.91	<.001		-
Engagement	White	.190		.346		.404	
	Black	.045		.473		.368	
	Wald χ^2	42.11	<.001	22.58	<.001	2.50	.11

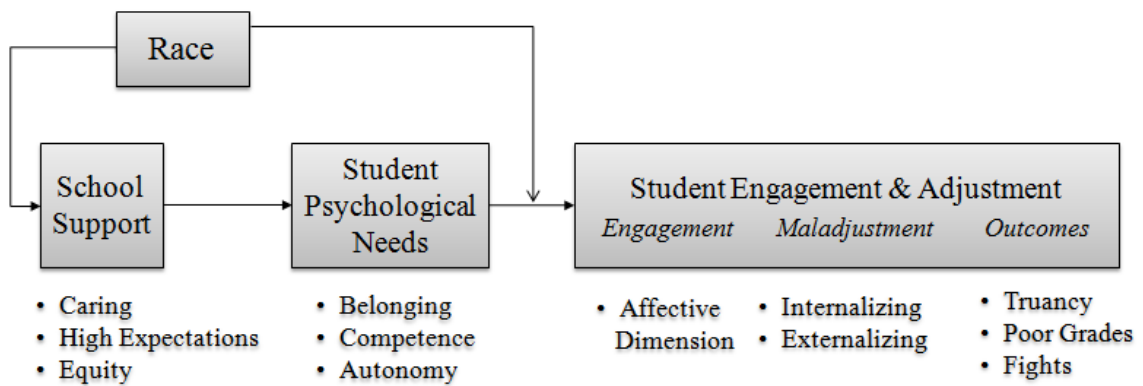


Figure 2.1. Theoretical model adapted from a Dynamic Model of Motivational Development of Engagement (Skinner & Pitzer, 2012) and a Youth Development and Resiliency Framework (Benard, 2004). Supportive interactions with adults at school are theorized to help meet students' core psychological needs, which in turn are theorized to shape students' levels of engagement with school and psychological functioning. Differential experience of school support among Black youth is theorized to mediate racial inequalities in student psychological needs fulfillment. Certain needs (i.e., Belonging) are theorized to be more salient to optimal functioning among Black relative to White youth. Latent factors are as follows: Teacher Caring (Caring); Equitable Treatment & Cultural Inclusion (Equity); Teacher High Expectations (Hiexp); Student Belonging (Belong); Student Competence (Comp); Student Autonomy (Auton); School Engagement (Engage); Externalizing Problems (Extern); Internalizing Problems (Intern).

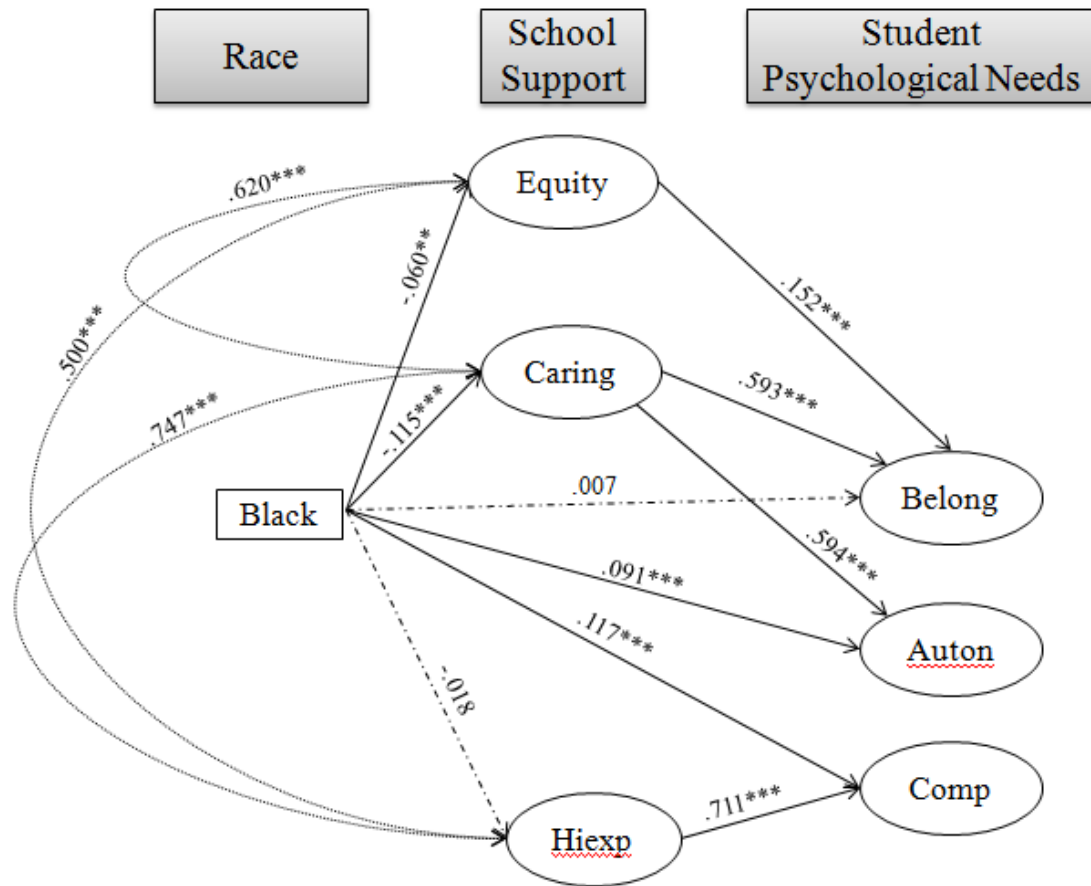


Figure 2.2. Mediation model. Race indicator is Black relative to White students. Model fit indices: $\chi^2 (191) = 4382.11$, $p < .001$, CFI = .95, TLI = .93; RMSEA = .03 (.031-.033), SRMR = .05. Asterisks indicate significance-level of the path coefficients, *** $p < .001$, ** $p < .005$. Dashed paths are non-significant. Latent factors are as follows: Equitable Treatment & Cultural Inclusion (Equity); Teacher Caring (Caring); Teacher High Expectations (Hiexp); Student Belonging (Belong); Student Competence (Comp); Student Autonomy (Auton).

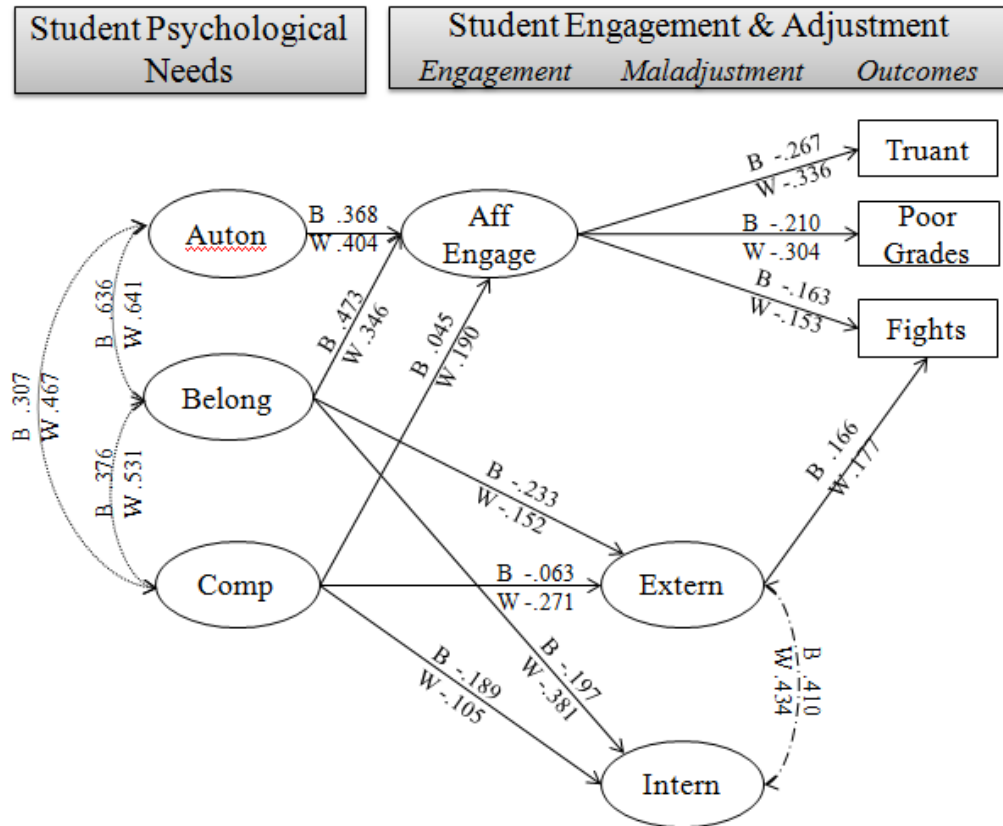


Figure 2.3. To examine race as a moderator, structural equations modeling of latent variables was used to estimate standardized path coefficients for White and Black students separately. Model fit indices: $\chi^2(498) = 11902.34$, $p < .001$, CFI=.91, TLI=.91, RMSEA=.05 (.045-.046), SRMR=.05. Path coefficients indicated with a B refer to estimates for Black students, coefficients indicated with a W refer to estimates for White students. All path coefficients included the model were statistically significant at the $< .001$ level. An omnibus test imposing parameter constraints to equality on all structural path coefficients indicated the structural model differed significantly by race (Wald $\chi^2=242.37$, $df=11$, $p < .001$). Latent factors are as follows: Student Belonging (Belong); Student Competence (Comp); Student Autonomy (Auton); Affective Engagement (Aff Engage); Externalizing Problems (Extern); Internalizing Problems (Intern).

Chapter 3

Promoting an Equitable and Supportive School Climate in High Schools:

The Role of School Organizational Health and Staff Burnout

(Manuscript 2)

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Chapter 3

Promoting an Equitable and Supportive School Climate in High Schools: The Role of School Organizational Health and Staff Burnout (Manuscript 2)

Abstract

In response to persistent racial disparities in academic and behavioral outcomes between Black and White students, equitable school climate has drawn attention as a potential target for school reform. This study examined differences in Black and White students' experiences of school climate and explored whether indicators of school organizational health and staff burnout moderated differences in students' school experiences by race. Utilizing hierarchical linear modeling with a sample of 18,397 Black and White students and 2,391 school staff in 53 schools, we found a consistent pattern of racial inequalities across three indicators of school climate (caring, equity, and engagement), such that Black students reported less positive experiences of school climate than White students. In addition, we found significant, positive associations between aggregated staff-report of school organizational health and student-reported school climate. Surprisingly, school organizational health was more strongly associated with positive perceptions of school climate among White students than Black students, translating into greater racial disparities in perceived school climate at schools with greater organizational health. We also found a trend of negative associations between staff-reported burnout and students' experience of school climate, such that the racial gap was smaller in schools with high ratings of burnout. These findings have implications for educators and education researchers interested in promoting school social contexts that equitably support student engagement and success.

Promoting an Equitable and Supportive School Climate in High Schools:

The Role of School Organizational Health and Staff Burnout

Attention to the issue of equitable school climate has emerged as educators endeavor to improve school climate for *all* students (Ross, 2013). In fact, school equity (i.e., respect for diversity, equitable treatment, cultural inclusion) is considered a central dimension within several school climate frameworks (e.g., National School Climate Council [e.g., Cohen, McCabe, Michelli, & Pickeral, 2009]; U.S. Department of Education's Safe and Supportive Schools [e.g., Bradshaw, Waasdorp, Debnam, & Lindstrom Johnson, in press]). Equitable school climate may also be understood as the equitable distribution of students' experience of supportive school climate as a resource across diverse student groups. Relatively scant research has examined racial inequality in students' experience of supportive school climate; however, the available research suggests that Black students may experience less supportive relationships, perceive less equitable treatment, and feel less engaged at school relative to their White peers (Bottiani, Bradshaw, & Mendelson, under review; Hughes & Kwok, 2007; Mattison & Aber, 2007).

One factor that may contribute to racial inequality in students' experience of school climate is school organizational health, which is defined as the capacity of schools to successfully adapt to a continually changing environment and new challenges (Hoy et al., 1991; Miles, 1965). A number of studies have identified the influence of school organizational health on teacher stress, job satisfaction, and teacher efficacy (Bevans, Bradshaw, Miech, & Leaf, 2007; Hoy & Woolfolk, 1993; Mehta, Atkins, & Frazier, 2013), as well as on teachers' perceptions of students' behavior and teachers' use of

disciplinary sanctions (Pas & Bradshaw, 2013; Pas, Bradshaw, Hershfeldt, & Leaf, 2010). Unfortunately, few studies have examined the association between school organizational health and racial inequalities in students' school experiences.

This study builds upon the school climate literature by examining whether staff perceptions of school organizational health and burnout differentially influence Black relative to White students' experience of school climate. We anticipated that significant racial gaps would be found in student report of school climate, such that Black students would report lower ratings of supportive school climate relative to White students, and that school organizational health and staff burnout would moderate these racial inequalities. Specifically, we expected school organizational health to be associated with fewer racial inequalities and staff burnout to be associated with greater inequalities. The issue of equitable school climate has implications for educational policies and programs aiming to enhance student engagement and reduce racial disparities in Black students' academic, social-emotional, and disciplinary outcomes at school (Aud et al., 2012; Latzman et al., 2011; Skiba et al., 2011). Therefore, it is critical that educators uncover factors that could help to promote equitable school climate.

School Climate and Racial Disparities in Student Engagement

Student engagement has been conceptualized as a multidimensional outcome of students' dynamic, reciprocal interactions within supportive relationships and social contexts that drive motivation (Connell & Wellborn, 1991; Skinner & Pitzer, 2012). Central to this concept of engagement is its focus on *process*; theory suggests that when students' core psychological needs are met by supportive school climates, students will in turn engage productively in school activities, but if their basic needs are unmet, students

will either withdraw or act out (Skinner & Pitzer, 2012). In fact, research confirms that schools with supportive climates tend to have more motivated students (Eccles et al., 1993), less student discipline problems (Cohen & Geier, 2010), and higher social-emotional wellbeing (Ruus et al., 2007; Shochet et al., 2006). Applying a disparities framework (Dankwa-Mullan et al., 2010) to this process, it follows that the inequitable distribution of students' experience of support at school could lead to disparities in student engagement and related behavioral and social-emotional outcomes. Indeed, research suggests not only that Black youth report lower ratings of support and connectedness (Furlong, O'Brennan, & You, 2011; Hughes & Kwok, 2007), but also that lower levels of support among Black students may contribute to racial disparities in engagement (Bottiani et al., under review).

Supportive relationships with adults at school may be particularly important for historically marginalized youth (Decker et al., 2007), who must navigate divergent cultural and ecological terrain between school, home, and neighborhood (Gay, 2002) and cope with experiences of prejudice and differential treatment at school (García-Reid, 2007). Evidence suggests that students' perceptions of differential treatment and discrimination by school staff may contribute to poor academic and behavior outcomes among Black youth (e.g., Bogart et al., 2013; Wong, Eccles, & Sameroff, 2003). In fact, accumulating evidence shows that perceived discrimination deters student engagement (Bingham & Okagaki, 2012; Dotterer et al., 2009). On the other hand, research on school climate suggests that students' perceptions of equitable treatment and cultural inclusiveness at school may positively influence students' affective and academic engagement (Debnam, Lindstrom Johnson, Waasdorp, & Bradshaw, in press).

School Organizational Health, Staff Burnout, and Racial Inequity

An important consideration in regard to racial inequality in students' experience of school climate is school organizational health. Considered a multidimensional construct, school organizational health is often measured by staff perceptions of collegial leadership, trusting and supportive relationships between coworkers (Hoy et al., 1991; Hoy & Woolfolk, 1993; Mehta et al., 2013), and personal connectedness to the school (O'Brennan, Waasdorp, & Bradshaw, 2014). Staff burnout, on the other hand, is inversely associated with school organizational health (Hakanen, Bakker, & Schaufeli, 2006; Shernoff et al., 2011). Consistent with research linking school organizational health with lower teacher stress, elevated efficacy, and more positive perceptions of students (Hoy & Woolfolk, 1993; Mehta, et al., 2013; Pas & Bradshaw, 2013), it seems reasonable that school organizational health would also enhance staff capacity to effectively navigate ecological and cultural differences to support Black students. Thus, it follows that gaps would be smaller in schools with high school organizational health, and larger in schools with high burnout. Below, we more closely consider four indicators related to school organizational health (i.e., personal connectedness, staff affiliation, supportive leadership, and burnout) and how they may be associated with racial inequity in students' school experiences.

Personal connectedness. Staff personal connectedness to school is often thought of as a composite of feelings of pride and belonging at the school, of being respected by others, and of overall job satisfaction (Butler, 2012; Skaalvik & Skaalvik, 2011). Staff experiencing low satisfaction also tend to feel anxious, worried, or depressed (Ho & Au, 2006); on the other hand, staff experiencing high job satisfaction demonstrate greater

commitment and motivation to teach (Barnabé & Burns, 1994; Feather & Rauter, 2004). Consistent with theories of motivation (e.g., Connell & Wellborn, 1991; Maslow, 1943), it follows that fulfillment of school staff members' basic needs for security, belonging, and respect may encourage school staff to develop and maintain higher-order competencies. For example, researchers in the field of cross-cultural and multicultural education suggest that meta-cognitive, reflexive and reflective practices such as mindfulness are necessary to build awareness and competencies to tap cultural assets and respond effectively to ecological divides present in diverse school settings (Dray & Wisneski, 2011; Paris, 2012). Considering higher-order cognitive skills may be necessary to be equitable in effectively teaching and supporting all students, it seems likely that fulfillment of teachers' core psychological needs for connectedness serves as an essential foundation.

Staff affiliation. School staff members' collegial affiliation with one another is also a salient aspect of school organizational health (Hoy et al., 1991). School staff who share openly with their peers also are inclined to be more open to professional development and innovation (Collie et al., 2011). Research also shows that when staff get along well, and respect, trust, and help one another, they have higher levels of efficacy, meaning they feel more comfortable and confident in handling challenges in their classrooms (Pas, Bradshaw, & Hersfeldt, 2012). Efficacy, in turn, has been associated with observed classroom culturally responsive practices (Debnam, Pas, Bottiani, Cash, & Bradshaw, under review). Thus, it follows that staff perceptions of collegiality may be related to their use of strategies that promote equitable school climate.

Supportive leadership. School staff members' relationships with principals and other administrators also have been shown to be a key indicator of school organizational health (Hoy et al., 1991) and relevant to school equity (Christle, Jolivette, & Nelson, 2005). Like staff affiliation, research shows that staff who feel supported by their principal are more confident and comfortable adapting to student behavior and needs (Pas et al., 2012), less stressed, and more satisfied at work; indeed, supportive leadership has been found to be particularly salient for these teacher outcomes in low-income, urban schools (Mehta et al., 2013). Consequently, it is possible that, as teachers feel more supported by their principals, they have greater emotional and cognitive reserve and confidence to adapt to diverse student needs, thereby fostering greater equity in the students' school experiences.

Burnout. Burnout is a construct closely associated with stress; it pertains to individuals' compromised ability to effectively carry out the job as a result of work-related stress (Betoret, 2009; Skaalvik & Skaalvik, 2010). A defining feature of teacher burnout is emotional exhaustion (Tsouloupas, Carson, Matthews, Grawitch, & Barber, 2010). When teachers become emotionally exhausted, they lose the ability to provide students with support (Maslach, Jackson, & Leiter, 1996). Accordingly, it seems likely that burnout would also limit teachers' capacity to respond supportively across diverse student perspectives. Research suggests that stress and stress-related biological mechanisms can bring out cognitive biases such as stereotyping (Friedland, Keinan, & Tytun, 1999) or racial prejudice (Terbeck et al., 2012). Recent experimental research on implicit stereotype-based biases against stigmatized groups highlights the mediating role of psychological stress (Kang, Gray, & Dovidio, 2013). It is plausible, therefore, that

burnout could elicit unconscious cognitive biases among staff, which in turn could negatively influence staff interactions with Black students.

The Present Study

To address gaps in the literature on school-level determinants of equitable school climate, this study examined associations between Black students' perceptions of caring, equity, and engagement, and staff-reported school organizational health (i.e., personal connectedness, staff affiliation, supportive leadership) and burnout. Two-level hierarchical linear modeling (HLM) was used to model cross-sectional data from 2,391 school staff and 18,397 Black and White students in 53 high schools. We tested three central hypotheses. First, we hypothesized that Black youth would report experiencing caring, equity, and engagement at lower levels than White youth, and that these gaps would persist even after controlling for both student- and school-level indicators of socioeconomic status and a number of other potential confounders. Second, we hypothesized that, regardless of race, student-report of equity, caring, and engagement would be positively associated with school organizational health and negatively associated with burnout. Third, we hypothesized that school organizational health and burnout would also significantly moderate the magnitude of racial gaps in students' experience of caring, equity, and engagement. To test this third hypothesis of school-level moderation of racial inequalities, we examined cross-level interactions of school organizational health and burnout on the associations between Black race and student perceptions of caring, equity, and engagement, while controlling for other potential influences at the school-level. We anticipated that high staff-reported school organizational health would be associated with smaller gaps between Black and White

youth, while high staff burnout would be associated with greater inequalities. This line of research has important implications for addressing disparities in academic and behavioral outcomes among high schoolers, where dropout and school failure have significant public health and economic impacts (Freudenberg & Ruglis, 2007).

Method

Data for this study were collected as part of the Maryland Safe and Supportive Schools Initiative (MDS3), which focused on school climate in high schools. Fifty-eight Maryland public high schools (traditional/comprehensive; grades 9-12) volunteered to participate during district-level meetings initiated by the Maryland State Department of Education. Students in participating high schools were asked to complete the MDS3 School Climate Student Survey (Bradshaw, Waasdorp, Debnam, & Lindstrom Johnson, in press). The student survey was administered online in language arts classrooms by school staff following a written protocol. Approximately 25 classrooms per school participated (i.e., seven 9th grade classrooms and six each of 10th, 11th, and 12th grade classrooms). The teacher and staff version of the MDS3 School Climate Survey was administered online. All student and staff participation was voluntary. Anonymous, cross-sectional data were collected in spring 2013. A passive parental permission process and youth assent process was followed for student data collection. All data analysis was approved by the researchers' Institutional Review Board.

Participants

The current sample was limited to staff and students that provided sufficient demographic information for inclusion in the current analyses; specifically, only staff who provided their school role and only students that provided their race/ethnicity,

maternal education, gender, and age were included in the study (because missingness on these covariates would result in listwise deletion of the case). The sample was then further limited to only Black and White students, due to the nature of our research questions. Five schools did not return an adequate number of staff surveys (i.e., >10) for inclusion in the study. Consequently, the sample for the study included 18,397 students and 2,391 school staff in 53 Maryland public high schools. An average of 395.5 students per school (median: 392.5, range: 110 – 1435) provided data for this study. The eligible student sample was 66.1% White ($N=12,169$) and 33.9% Black ($N=6,228$). Over 92% of the 2,301 school staff were teachers, 63.4% were female, and 85.8% were White, with an average of 45.1 teachers and staff per school (median: 37, range: 11 - 132) providing data for this study. Additional demographic characteristics of students and staff are presented in Table 3.1. The total school enrollment ranged from 323 to 2240 students ($M = 1267.5$, $SD = 477.6$). The percentage of staff with advanced certification ranged from 41.3% to 88.5% ($M = 66.5$, $SD = 11.5$). The percentage of students receiving free or reduced-price meals (FARMs) ranged from 6.8 to 70.4% ($M = 36.8$, $SD = 18.2$). School-level demographics and correlations are given in Table 3.2.

Measures

Student report of school climate. The MDS3 School Climate Survey follows the U.S. Department of Education's Safe and Supportive Schools model of school climate. The measure is based on previously validated indicators of school climate, including items drawn from the National Longitudinal Study on Adolescent Health (Resnick et al., 1997) and the School Development School Climate Survey (Haynes, Emmons, and Ben-Avi, 2001). The *caring* scale had a Cronbach's alpha (α) of .86 and is

comprised of 4 items focused on students' experience of caring ("My teachers care about me"), respect ("At this school, teachers respect the students" and "My teachers listen when I have something to say"), and trust ("At this school, students trust the teachers") in their relationships with their teachers. The *equity* scale (Debnam et al., in press; $\alpha=.83$) is comprised of 4 items, three of which focused on students' perceptions of equitable treatment based on race, gender, and socioeconomic status (e.g., "At this school, students of all races are treated the same") and one focused on cultural inclusiveness ("The school provides instructional materials that reflect my culture"). The *engagement* scale ($\alpha=.84$) is comprised of 3 items that assess an affective dimension of engagement ("I like this school," "I like coming to this school," and "I enjoy learning at this school"). All response options were on a 4-point Likert scale from *disagree strongly* (1) to *agree strongly* (4), with higher scores indicating more favorable school environment. Students also responded to a series of questions regarding demographic characteristics, including age, gender, maternal education level (higher score signifies more education), and race and ethnicity, which were included in this study. The race variable was dummy coded to indicate Black students (1) relative to White students (0).

Staff report. Staff completed an online self-report survey which included a measure of *personal connectedness* ($\alpha = .89$); it was comprised of 6 items derived from the Organizational Social Context measure (Glisson et al., 2008) that reflected staff school pride ("People who work here feel pride in the school"), belonging ("People at this school care about me as a person" and "At this school, I feel like I belong"), esteem ("My ideas are used and listened to") and overall job satisfaction ("I am satisfied with the recognition you get for doing a good job" and "This school inspires you to do the

very best at your job”). They also reported on *staff affiliation* ($\alpha = .90$), which draws 4 items from the Organizational Health Inventory (OHI; Hoy & Woolfolk, 1993) and reflected staff views of collegial trust (Staff have trust and confidence in each other”), support (“Staff are willing to help each other out”), respect (“Staff respect each other”), and overall affiliation (“Staff get along well”) at their school. The *supportive leadership* scale ($\alpha = .93$) included 6 items, also from the OHI (Hoy & Woolfolk, 1993), characterizing the principal’s accessibility (“Principal at this school is friendly and approachable”), support (“Principal looks out for faculty and staff” and “Principal goes out of his or her way to show appreciation for faculty and staff”), clear expectations (“Principal at this school lets faculty and staff know what is expected of them”), and the overall school administration’s responsiveness regarding staff concerns and problems (“School administration works collaboratively with staff to solve problems” and “School administration responds promptly to my concerns”). The *burnout* scale ($\alpha = .90$) included four items tapping staff experience of emotional exhaustion at work. Items include “I feel burned out from my work”, “I feel emotionally drained from my work”, “I feel like I am at the end of my rope”, and “I feel used up at the end of the work day” derived from the Maslach Burnout Inventory (Maslach, Jackson, & Leiter, 1996). Response options were on a 4-point Likert scale from *disagree strongly* (1) to *agree strongly* (4), with higher scores indicating a more favorable environment for the school organizational health scales, and more burnout for the burnout scale. Each of the four staff-report scale scores was aggregated to create four school-level mean scores (Hoy & Woolfolk, 1993).

School demographic characteristics. Other school-level indicators were obtained from the Maryland State Department of Education for the school year, including school enrollment, percentage highly qualified teachers (as indicated by advanced professional certification), minority concentration (percentage of enrollment comprising Black and Latino students), and percentage of students receiving free or reduced price meals (FARMs), which has been shown to be valid indicator of low household income (Ensminger et al., 2000).

Preliminary Analyses

Measurement validity and invariance. Confirmatory factor analysis (CFA) utilizing WLSMV estimation (all items were treated as categorical) was used to examine the four-factor model of school organizational health; it provided adequate fit to the data, $\chi^2 (164) = 1460.7, p < .001$, CFI = .98, TLI = .98, RMSEA = .058 (95% CI: .056-.061). For the student outcomes, a multiple group CFA utilizing WLSMV estimation (all items were treated as categorical) grouping by race ($N=12,169$ White and 6,228 Black) found that the hypothesized three-factor model of caring relationships, equity, and engagement provided adequate fit to the data, $\chi^2 (109) = 2069.29, p < .001$, CFI = .99, TLI = .99 RMSEA = .044 (95% CI: .043-.046). We also examined measurement invariance in the factor structure between Black and White students through a series of configural, metric, and scalar models (Meredith, 1993) fit through multiple group CFA in *Mplus* with WLSMV estimation (all items were treated as categorical). Consistent with Cheung and Rensvold (2002), measurement invariance was found through the multi-group model demonstrating adequate fit to the data a difference in CFI between models at less than .01. Specifically, the findings suggested that the assumption of measurement invariance holds. When

comparing metric against configural models, $\chi^2 = 104.311$ (df = 8), $p < .001$, $\Delta CFI = .000$, $\Delta TLI = .002$, $\Delta RMSEA = .002$. Comparing scalar against configural models, $\chi^2 = 155.738$ (df = 27), $p < .001$, $\Delta CFI = .002$, $\Delta TLI = .008$, $\Delta RMSEA = .01$.

Missing data. After limiting the student sample to those who provided adequate initial demographic information (race, age, gender, and maternal education), descriptive analyses found very little missing outcome data (<1% of students were missing items). Our analyses assumed that data were missing at random (MAR; Arbuckle & Wothke, 1999). Although the amount of missing data in the study was negligible, analyses did suggest that Black relative to White race was associated with missing items for the equity and caring scales, and that male gender and maternal education were associated with missing items within the engagement scale. However, the association of these variables with missingness was quite small (estimates ranged from .001 - .004), and maternal education and gender were included as controls in the study. Black race is a central predictor in the study; however, because Black race is associated with lower caring, equity, and engagement, it is likely that bias in the estimates resulting from missingness (if any) would minimize rather than exaggerate the association between race and the outcomes. The multilevel models were conducted in HLM 7, which adjusts parameter estimates for attrition using maximum-likelihood (REML) estimation, a widely recognized and appropriate means of handling missing data under the assumption that data are MAR (Schafer & Graham, 2002; Raudenbush & Bryk, 2002).

Multicollinearity. Preliminary analyses in Stata 11 calculated the correlations between the school-level covariates (see Table 3.2.) and to explore the potential of collinearity. Correlations among level-2 aggregated staff-reported variables were

inflated, and the variance inflation factor (VIF) and tolerance diagnostics (Tabachnick & Fidell, 2007) indicated that collinearity was a concern with regard to one of the staff-reported variables (personal connectedness). As a result, the four staff-reported, school-level predictor variables were modeled in a series of separate multilevel models (with their corresponding interaction terms). For ease of reference, however, the three school organizational health predictors are shown together in one table in the results.

Overview of Multilevel Analyses

We used a multilevel approach to examine our main hypothesis that average staff-reported school organizational health would moderate discrepancies in Black and White students' perceptions of school climate, even after controlling for other school- and individual-level factors. An HLM approach was selected because it allowed us to test our hypothesis of school-level moderation of racial inequalities by examining cross-level interactions of school organizational health on the association between race and student report of school climate, while controlling for other school-level fixed and random effects. Moreover, because the data (students nested within schools) are hierarchical in nature, individuals from the same schools likely have correlated errors, and a basic assumption of multivariate regression would otherwise be violated (Luke, 2004).

Multilevel modeling allows for correlated error structures.

To examine our central research question, we estimated two-level hierarchical linear models using HLM 7 (Raudenbush et al., 2011). A stepwise approach to model building was taken, such that the HLM models were built one variable and one level at a time in order to be sensitive to the stability of findings with and without non-significant effects (Raudenbush & Bryk, 2002). Each level-1 parameter was inspected individually

to assess the significance of the residual variance. Any covariates with non-significant variances were fixed (Hox, 2002; Raudenbush & Bryk, 2002) and grand-mean centered; those with significant variances were allowed to randomly vary and were group-mean centered (Croninger, 2013).

For all outcome variables, we fit linear hierarchical models and generated standardized coefficients. The overall fit of the models was assessed using the Akaike information criterion (Akaike, 1974) and likelihood ratio tests (Raudenbush & Bryk, 2002). All outcomes were measured at the student level (level 1). Additional covariates included at level 1 were age, gender, maternal education, and race (dummy coded Black relative to White). At level 2, in addition to school-aggregated mean staff report of school organizational health, we included total student enrollment, percentage highly qualified teachers, percentage Black and Latino students, percentage of students receiving FARMs, and dummy indicator for study group (intervention or control). All level 2 variables were grand mean centered. To examine whether school average school organizational health moderated discrepancies between Black and White students' perceptions of positive school climate, we tested cross-level effects between the level-1 race indicator on student outcomes with hypothesized school-level variables (i.e., teacher and staff-reported personal connectedness, staff affiliation, supportive leadership, and burnout) at level 2. For each outcome variable, four models were fit to model staff-reported 1) personal connectedness, 2) staff affiliation, 3) supportive leadership, and 4) burnout separately. Each model included the level 2 variable main effect and corresponding cross-level effect.

Results

Individual-Level Associations with Students' Perceptions of School Climate

Tables 3-4 present findings from two-level hierarchical linear models, which examine the associations between staff-reported school organizational health and burnout, student race, and student-reported school climate, while controlling for other student- and school-level covariates. The student-level variables (upper) sections on each of Tables 3-4 depict the influence of the student demographic variables on the domains of student-reported school climate (caring, equity, and engagement). Because the student-level coefficients were essentially unchanged across the models, for simplicity the specific estimates and significance-levels given here and in Table 3.3. refer only to those from the personal connectedness predictor model.

Consistent with our first hypothesis, for all models and across all outcome indicators, Black students' report of school climate was lower than White students'; this was true for caring ($\gamma = -.075, p \leq .001$), equity ($\gamma = -.049, p \leq .01$), and engagement $\gamma = -.053, p \leq .001$), even after controlling for maternal education level (a proxy for socioeconomic status), age, and gender at level 1. Higher student-reported SES (i.e., higher maternal education) was associated with higher ratings of caring ($\gamma = .059, p \leq .001$), equity ($\gamma = .040, p \leq .001$), and engagement ($\gamma = .076, p \leq .001$). Overall, males reported higher levels of caring ($\gamma = .042, p \leq .001$), equity ($\gamma = .028, p \leq .001$), and engagement ($\gamma = .051, p \leq .001$) than females. Older age was unassociated with caring, but was negatively associated with perceived equity ($\gamma = -.015, p = .05$) and engagement ($\gamma = -.045, p \leq .001$).

School-Level Associations with Students' Perceptions of School climate

To examine our second hypothesis, we explored the associations between student reported school climate (i.e., caring, equity, and engagement) and staff-reported burnout and school organizational health (i.e., personal connectedness, staff affiliation, and supportive leadership), while controlling for several other school-level covariates (see Tables 3-4).

School organizational health. Table 3.3. presents models examining the association between staff-reported personal connectedness, staff affiliation, and supportive leadership (aggregated at level-2) and students' reported school climate. Across all three school climate outcomes, students in schools characterized by higher levels of staff-reported personal connectedness to their school reported higher levels of caring ($\gamma = .067, p \leq .01$), equitable treatment and cultural inclusion ($\gamma = .085, p \leq .001$), and engagement ($\gamma = .106, p \leq .001$). Students in schools characterized by higher levels of staff-reported staff affiliation also reported higher levels of caring ($\gamma = .067, p \leq .01$), equity ($\gamma = .074, p \leq .001$), and engagement ($\gamma = .084, p \leq .001$). Last, students in schools characterized by higher levels of staff-reported support from their principals again reported higher levels of caring ($\gamma = .050, p \leq .01$), equity ($\gamma = .056, p \leq .05$), and engagement ($\gamma = .075, p \leq .01$).

Burnout. Table 3.4. presents models examining the association between staff-reported burnout (aggregated at level-2) and student-reported school climate. Contrary to our hypothesis, student report of caring did not vary as a function of staff burnout ($\gamma = -.031, p = .119$). The findings for burnout on perceptions of equity were only marginally significant ($\gamma = -.042, p = .068$), although the estimate was in the hypothesized direction.

However, as hypothesized, student-reported engagement was significantly lower in schools characterized by higher burnout ($\gamma = -.064, p=.008$).

Other school-level covariates. Because differences in covariate school-level coefficients were negligible across the school organizational health predictors, for ease the specific estimates and significance-levels given here and in Table 3.3. refer only to those from the personal connectedness model. The percentage of highly qualified teachers consistently had a significant, positive association with caring ($\gamma = .063, p=.002$) and engagement ($\gamma = .076, p=.002$), while it was only marginally (but positively) associated with student perceptions of equity ($\gamma = .042, p=.079$). Schools with higher concentrations of Black and Latino students had lower levels of student-reported caring ($\gamma = -.059, p=.003$), but higher equity ($\gamma = .055, p=.022$); yet, there was no association with student engagement. Another unique finding across all the models for equity was that students in schools with a high FARMs rate reported significantly lower equity ($\gamma = -.104, p \leq .001$); however, this was not significant for caring or engagement.

Cross-Level Interactions of School Organizational Health on Racial Inequalities

To examine our third hypothesis, we tested cross-level interactions of the influence of each of the school organizational health dimensions and staff burnout on the association between race and student-reported school climate, which are presented in Tables 3-4. Contrary to our hypothesis, none of the cross-level effects of school organizational health on racial inequalities in caring were significant (see details below). However, all the cross-level interactions for equity were significant, and two interactions were significant for engagement (the significance of the other two was marginal). In each instance, the moderation of racial inequalities was in the reverse direction of what

we expected, such that the slopes of the associations for White students were steeper than the slopes for Black students.

Personal connectedness. In the graphs presented in Figure 3.1., the cross-level interactions between staff personal connectedness to their school and racial inequalities in caring, equity, and engagement are depicted visually. It appears with regard to caring, staff-reported personal connectedness was associated with Black and White students' experience of caring in approximately equal measure, such that the initial discrepancy remained unchanged in schools with high staff personal connectedness ($\gamma = .000$, $p > .500$), although among both Black and White students the association was positive. With respect to equity, teacher and staff personal connectedness had a sizeable positive association with White students' perceptions of equity, while the association with perceived equity was negligible or even slightly negative among Black students; therefore the disparity was exacerbated ($\gamma = -.065$, $p \leq .001$). In regard to engagement, staff personal connectedness again was positively associated with both White and Black students' experience of engagement; however, the increase was significantly greater for White students than for Black students, and thus the disparity was amplified ($\gamma = -.039$, $p = .009$).

Staff affiliation. In Figure 3.2., the line graphs illustrate the cross-level interactions between staff affiliation and racial inequalities in students' experience of caring, equity, and engagement. As illustrated in the top left graph, Black and White students' perceptions of caring were uniformly positively associated with staff affiliation ($\gamma = .003$, $p > .500$). Therefore, although report of caring is higher in both groups in schools with higher affiliation, the disparity remained. However, for the associations of

staff-reported staff affiliation with student-reported equity the slope was significantly steeper for White students than Black students, such that the racial gap in perceived equity is significantly wider in schools with high levels of staff affiliation ($\gamma = -.044$, $p=.010$). In regard to engagement, the slope for White students' in schools with high staff affiliation was steeper than for Black students, although this finding was only marginally significant ($\gamma = -.027$, $p=.059$).

Supportive leadership. A similar pattern of findings in the cross-level interaction of supportive leadership on racial inequalities in caring, equity, and engagement is presented in the graphs shown in Figure 3.3.. The slopes for White and Black students' experiences of caring are shown to increase to a comparable degree in association with higher levels of staff-reported supportive leadership ($\gamma = .005$, $p>.500$). However, there was a discrepancy in the association between supportive leadership and equity for Black vs. White students, such that the slope for White students' perceptions was significantly steeper than Black students' ($\gamma = -.046$, $p=.019$). In fact, there was a slightly negative association of supportive leadership on equity among Black students. In schools with low levels of staff reported supportive leadership, White and Black students fared similarly in their experience of engagement. However, in schools with high supportive leadership, White students' experience of engagement was significantly greater than Black students' ($\gamma = -.029$, $p=.042$).

Cross-Level Interactions of Burnout on Racial Inequalities

In Figure 3.4., the line graphs report the interactions of staff-reported burnout on racial inequalities in caring, equity, and engagement. The difference in the influence of burnout on caring between White and Black students was negligible ($\gamma = -.004$, $p>.500$).

In contrast, staff-reported burnout was associated with a less favorable rating of equity among White students compared to Black students ($\gamma = .044, p=.002$); in fact, among Black students, perceived equity was slightly improved in high burnout schools. Likewise, White students' experience of engagement was more negatively influenced by attending high burnout schools than was Black students', although this finding was only marginally significant ($\gamma = .024, p=.076$). Thus, disparities in equity and engagement were actually mitigated by burnout.

Discussion

Although a number of studies have concluded that staff perceptions of school organizational health are associated with favorable outcomes among students generally (Brookover et al., 1978; Gottfredson, 1989), research examining its influence within historically marginalized student populations or its impact on racial disparities is almost entirely lacking. Our study addressed this gap in the literature by examining how school organizational health and staff burnout differentially relate to Black and White students' experience of supportive school climate (i.e., caring, equity, and engagement). This line of inquiry is relevant for educators and education researchers interested in fostering school social contexts that equitably support the engagement and success of all students.

Racial Inequalities in Students' Experience of Supportive School Climate

Consistent with our hypothesis, we found that Black youth reported significantly lower levels of caring, equity, and engagement relative to White students, with the largest inequity in their experience of caring. These findings persisted even after controlling for socioeconomic status at the student-level (maternal education) and school-level (free and

reduced price meals), in addition to controlling for student gender and age, and school percent highly qualified teachers, percent minority enrollment, and school size.

The finding regarding racial inequality in school climate is consistent with a small but growing number of quantitative studies documenting racial inequities in students' perceptions of supportive school experiences (Bottiani et al., under review; Furlong et al., 2011; Hughes & Kwok, 2007; Mattison & Aber, 2007). The findings mirror research documenting Black students' disparate exposure to punitive, exclusionary discipline such as office disciplinary referrals and suspensions (e.g., Bradshaw, Mitchell, O'Brennan, & Leaf, 2010; Gregory, Skiba, & Noguera, 2010; Skiba et al., 2011) and support the large, extant body of interpretive and theoretical research highlighting the necessity of school reform efforts to promote more equitable, culturally responsive, and culturally sustaining school practices (e.g., Au, 2009; Day-Vines & Day-Hairston, 2005; Epstein, Mayorga, & Nelson, 2011; Gay, 2000; Griner & Stewart, 2013; Garza, 2009; Ladson-Billings, 1995; Lee, 2011; Moll, Amanti, Neff, & Gonzalez, 2005; Nieto, 2013; Paris, 2012; Toldson & Lemmons, 2013; Ware, 2006; Weinstein, Tomlinson-Clarke, & Curran, 2004).

Considering the vast majority of staff in the study was White (86%), while only 8% of staff was Black, it is not surprising that the Black youth in the study experienced lower levels of caring, equity, and engagement at school than their White peers. It seems intuitive that youth may experience more responsive and engaging interactions with staff who come from similar racial and cultural backgrounds, and this may be particularly true for youth who come from historically marginalized populations. In fact, frameworks for enhancing teacher cultural responsiveness grew out of historical, cultural models of Black teaching (Ware, 2006). Many scholars in this field have asserted that Black educators

respond to their Black students in more culturally relevant ways than White teachers (Ladson-Billings, 2005) and may be more intentional in providing counter-narratives for future intellectual and professional achievement with which Black students can identify (Perry, Steele, & Hillard, 2003).

Moreover, empirical research suggests that Black students may fare more poorly in classroom interactions with White teachers. For example, one study documented that Black students receive worse evaluations of their externalizing behaviors (e.g. classroom disruptive behavior) when they have a White teacher than when they have a Black teacher (Bates & Glick, 2013). Therefore, one important future research question may be to examine whether schools with higher percentages of Black staff are associated with reduced racial inequalities between Black and White students' experiences of supportive school climate. However, we know from school discipline disproportionality research that racial/ethnic match of students and teachers may not necessarily be the whole solution. For example, one recent study found that teacher-student racial ethnic match did not reduce Black students' risk of being removed from the classroom (Bradshaw et al., 2010). And, while efforts to diversify the teacher workforce pipeline are ongoing, White educators continue to predominate, even in schools with large populations of Black and Latino youth (Frankenberg, 2006). Therefore, an array of strategies in addition to improving the diversity of the educator workforce may be necessary to reduce racial gaps in students' supportive school experiences.

School Organizational Health, Staff Burnout, and Equitable School Climate

Our second and third hypotheses suggested that improvements in school organizational health may be one such additional strategy. Consistent with our second

hypothesis, we found that school organizational health was significantly positively associated with students' report of caring, equity, and engagement overall, while burnout was negatively associated with school climate (although the significance of the associations for burnout were less consistent). We were particularly interested in examining whether students' report on the dimension of equitable treatment and cultural inclusion varied with changes in school organizational health and burnout. Examining the slopes without regard to race across the staff-reported predictors in their influence on students' perceptions of equity, it would appear that school organizational health has potential to promote more equitable school climate.

However, on examination of the *differential* influence of school organizational health and burnout on Black relative to White students' perceptions of equity, another picture emerges. Although school organizational health was positively associated with perceived equity among White students, Black students' report of equity remained relatively fixed regardless of shifts in school organizational health. As a result, the cross-level interactions for equity were significant; however the effects were in the reverse of what we anticipated in our third hypothesis. Specifically, high levels of school organizational health were associated with widening racial gaps in students' experiences of school equity.

One implication of this finding for evaluating school reform efforts is that we may need to carefully assess racial inequalities in students' perceptions in order to gauge improvements in equitable school climate. Specifically, it appears that simply measuring students' overall perceptions of equity as an indicator of equitable school climate may not be enough; rather, we need to examine racial (in)equality in student experiences of equity

and other dimensions of school climate as an outcome in and of itself. Some might suggest instead assessing other informants' report of school equity, such as staff report. However, research indicates that staff perceptions school equity and culturally inclusive practices may be subject to social desirability bias (Bottiani et al., 2012). Moreover, as discussed, the vast majority of school staff are often White, which further introduces potential bias. Emerging research is therefore exploring the potential for establishing reliable, valid observational measures of equitable, culturally responsive and sustaining school and classroom practices (Debnam et al., under review).

A similar pattern of findings emerged in our examination of disparities in engagement, with significant cross-level interactions producing moderation effects in the reverse of what we predicted, whereas we found no significant influence on racial inequalities in students' experience of caring. Our findings nonetheless demonstrate that Black students' experience of caring and engagement is higher in schools with higher school organizational health, as it is with White students; however, the slope of this association is not as steep, suggesting that school organizational health may be necessary (albeit not sufficient) to promoting equitable and supportive school climate experiences among Black youth.

A number of questions are raised by the collective findings from the cross-level interactions of school organizational health and burnout on racial inequalities in students' experience of school climate that merit future research. For example, the extant research suggests that school organizational health is positively associated with factors such as teacher efficacy and reduced stress, which in turn have been associated with culturally responsive practices and lower levels of stereotype-based cognitive biases respectively

(Debnam et al., under review; Kang, Gray, & Dovidio, 2013; Mehta, et al., 2013; Pas & Bradshaw, 2013). Therefore, we expected school organizational health to contribute to closing racial gaps, rather than widening them. One possible reason for this counterintuitive finding is that our study did not actually assess schools' access to resources to enhance school equity or culturally sustaining practices (e.g., professional development, training, and coaching for staff). Staff may have been primed to engage in more equitable practices in schools with higher levels of school organizational health, but still lacked access to resources to build practical skills necessary to promote equitable school climate. Thus, it is important that future research examining equitable school climate includes measures of school involvement in initiatives to improve school equity and staff access to and engagement trainings and other professional development to improve culturally responsive and culturally sustaining practices.

There were also a set of unique findings with regard to student perceptions of school equity and the school demographic covariates in the model. Most notably, students' perceptions of equity, but not caring or engagement, were significantly lower within low-SES schools (i.e., schools characterized by a high percentage of enrollment eligible for FARMs), even when controlling for students' SES (i.e., maternal education level) and other school-level factors like percent highly qualified teachers and percent minority. This finding suggests that low-SES schools may be more prone to inequitable school climate.

Limitations and Strengths

There are some limitations worth noting when interpreting the findings of this study. The school equity scale in this study featured separate questions for race, gender,

socioeconomic status, and cultural inclusion. While the factor analyses and internal consistency reliability suggested that the scale items are collectively tapping the construct of students' perceived fair and inclusive treatment of all students at school, some might question whether one item weighed more heavily than the others. Weighted scoring coefficients following factor analyses in Stata suggest that the influence of each of the items were approximately equal (i.e., coefficients ranging between .27-.32). Although this scale tapped students' feelings of being treated the same as other students, we recognize that to achieve equity in resources and opportunities, students may benefit from differential supports. Future research may explore the use of indicators that tap this aspect of equity. Another point is that the data are self-report, which limits assurance of the validity of the data; however, we did employ report from multiple informants and sources (i.e., staff report, student-report, school demographics provided by MDSE) which mitigates this concern. The data were also cross-sectional; therefore, we were not able to infer causality between the school-level predictors and student-reported climate. Future research should examine data drawn from multiple time points in order to establish the direction of causality. In addition, schools included in this study were from suburban, rural, and urban fringe communities within a single state; therefore, we are not certain the extent to which they will generalize to other communities. Although we modeled nesting only at the school-level, student-level data were nested within classrooms, within schools, and within school districts. Although there is research that suggests important effects of classroom-level factors on school climate at the elementary level (Koth, Bradshaw, & Leaf, 2008), where students remain in their classrooms much of the day, there is less evidence to support its consequence on estimates in high schools, where classrooms

change with each class period. Furthermore, because student report was on the school's climate, classroom factors were not of direct interest in this study. We did not model the district-level because, with only 12 districts, it would have significantly limited power; however, future studies including large samples of districts may want to examine these influences, particularly because school reform initiatives relevant to school equity may be initiated at the district-level.

Despite these limitations, this study has a number of strengths, most notably the large sample size, the utilization of data from multiple informants, the inclusion of teaching and non-teaching school staff, and the use of multi-level modeling to handle data nested within schools. Moreover, the focus on examining school contextual influences on racial inequalities is a strength of this study and fills a gap in the literature that is important to informing school practices to improve outcomes for Black youth. Although we were not able to examine inequalities in perceptions among other historically marginalized groups (e.g., Latino students), this will be a focus of future studies.

Conclusion

Taken together, these findings suggested that Black students' perceptions of supportive school climate were significantly lower than their White peers', while also being somewhat less responsive to variation in school organizational health and burnout. This was particularly true of Black students' perceptions of school equity. Therefore, although the notion of improved school organizational health as a "rising tide that lifts all boats" has potential, overall the influence was not enough to overcome (or even improve) inequalities in students' experience of school climate. This research suggests that while

school organizational health may be a *necessary* focus in improving students' experience of equitable and supportive school climate, it is not *sufficient* to close the gaps. Rather, an explicit focus school equity, cultural responsiveness and inclusion, and culturally sustaining school practices may be key to reform efforts to more equitably support all students' engagement in school.

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Table 3.1
Student and Staff Characteristics

Student characteristics (<i>N</i> = 18,397 Students)	N (%)
Race/Ethnicity	
Black	6228 (29.9)
White	12,169 (58.3)
Maternal education	
Did not graduate from high school	1,533 (8.3)
Graduated from high school	5,293 (28.7)
Attended some college	3,793 (20.6)
Graduated from college	7,778 (42.3)
Age ^a	15.89 (1.28)
Gender	
Male	9,174 (49.9)
Female	9,223 (50.1)
Staff characteristics (<i>N</i> = 2,391 Staff)	N (%)
Race/Ethnicity	
Asian/Pacific Islander	28 (1.2)
Black	179 (7.5)
White	2,047 (85.8)
Hispanic	32 (1.3)
Other	99 (4.2)
Role	
Teacher	2,218 (92.8)
Other professional (student services)	173 (7.2)
Gender	
Male	860 (36.0)
Female	1527 (64.0)
Grade	
9 th Grade	356 (14.9)
10 th Grade	317 (13.3)
11 th Grade	206 (8.6)
12 th Grade	147 (6.2)
Multiple Grades or Other	1364 (57.1)

^a Age represents mean with standard deviation in parentheses.

Table 3.2.

Correlations among the School-Level Covariates (N=53 schools)

School-level variables	1	2	3	4	5	6	7	8
1. FARMs (%)	36.8 (18.2)							
2. Enrollment (M)	-.34*	1268 (478)						
3. Personal connectedness (M)	-.39*	-.16	2.94 (.26)					
4. Staff affiliation (M)	-.19	-.17	.85*	3.05 (.21)				
5. Supportive leadership (M)	-.33*	-.09	.86*	.69*	2.97 (.38)			
6. Burnout (M)	.32*	.12	-.84*	-.72*	-.73*	2.61 (.29)		
7. Highly qualified teachers (%)	-.59*	-.01	.40*	.24	.24	-.29*	66.5 (11.5)	
8. Minority concentration (%)	.54*	.05	-.40*	-.34*	-.25	.25	-.51*	37.1 (24.1)

Note. FARMs refers to percent of student enrollment eligible for free- and reduced-price meals subsidy. Percentages (%), means (M), and standard deviations (reported in parentheses) are displayed on the diagonal. Correlations among level-2 aggregated staff report variables are inflated. VIF and tolerance statistics indicated collinearity concerns with personal connectedness. The four staff-reported, school-level independent variables were conservatively modeled separately.

* $p < .05$.

Table 3.3.

Two-level models examining staff-reported school organizational health and student-reported caring, equity, and engagement

	School Organizational Health								
	Caring			Equity			Engagement		
	γ	SE	t ratio	γ	SE	t ratio	γ	SE	t ratio
Student-level variables									
Black race	-.075 ***	.010	-7.45	-.049 **	.018	-2.72	-.053 ***	.012	-4.40
Maternal education	.059 ***	.010	6.13	.040 ***	.008	5.23	.076 ***	.012	6.25
Age	-.010	.011	-0.94	-.015 *	.007	-1.96	-.045 ***	.009	-5.01
Male gender	.042 ***	.009	4.89	.028 ***	.007	3.86	.051 ***	.011	4.70
School-level variables									
Personal connectedness	.067 **	.020	3.33	.085 ***	.021	4.03	.106 ***	.020	5.20
Staff affiliation	.067 ***	.018	3.79	.074 ***	.019	3.97	.084 ***	.018	4.79
Supportive leadership	.050 **	.018	2.71	.056 *	.021	2.61	.075 **	.021	3.49
Study group	-.020	.016	-1.21	.000	.018	-0.01	-.016	.017	-0.95
FARMs	.017	.025	0.66	-.104 ***	.027	-3.81	.006	.032	0.18
Enrollment	.014	.022	0.63	-.007	.021	-0.32	.047 ^b	.024	1.95
Highly qualified teachers	.063 **	.020	3.20	.042 ^b	.024	1.79	.076 **	.023	3.27
Minority concentration	-.059 **	.019	-3.17	.055 *	.023	2.37	-.010	.022	-0.43
Cross-level interactions									
Personal connectedness x race	.000	.011	0.00	-.065 ***	.018	-3.59	-.039 **	.014	-2.73
Staff affiliation x race	.003	.013	0.22	-.044 **	.016	-2.69	-.027 ^b	.014	-1.93
Supportive leadership x race	.005	.010	0.52	-.046 *	.019	-2.43	-.029 *	.014	-2.08
Proportion of between-school variance explained									
Personal connectedness		64.2%			64.5%			66.6%	
Staff affiliation		65.0%			60.8%			59.9%	
Supportive leadership		35.4%			55.1%			56.6%	
AIC									
Personal Connectedness		51422.940			51407.154			51427.68	
Staff Affiliation		51420.990			51417.74			51438.69	
Supportive Leadership		51427.107			51421.69			51440.81	

Note. The school organizational health dimensions reflect level-2 aggregated staff-report. For ease of reference, all 3 school organizational health predictors are shown together here, however each were modeled separately with their corresponding interaction term to avoid multicollinearity concerns. Only coefficients and accompanying statistics for individual and school-level covariates in the personal connectedness models are shown; differences in these estimates across the three predictor models were negligible. Coefficients are standardized. $N=18,397$ students, $J=53$ schools.

Unadjusted ICCs, Caring = .03, Equity = .04, Engagement = .04. *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$. ^b marginal significance at $p \leq .08$.

Table 3.4.

Two-level models examining staff-reported burnout and student-reported caring, equity, and engagement

	Burnout								
	Caring			Equity			Engagement		
	γ	SE	t ratio	γ	SE	t ratio	γ	SE	t ratio
Student-level variables									
Black race	-.075 ***	.010	-7.54	-.049 *	.019	-2.64	-.053 ***	.013	-4.04
Maternal education	.059 ***	.010	6.10	.040 ***	.009	4.30	.076 ***	.008	9.93
Age	-.010	.011	-0.98	-.015	.009	-1.72	-.046 ***	.007	-6.14
Male gender	.042 ***	.009	4.89	.028 ***	.008	3.55	.051 ***	.007	7.07
School-level variables									
Burnout	-.031	.019	-1.59	-.042 ^b	.023	-1.87	-.064 **	.023	-2.77
Study group	-.017	.018	-0.92	.005	.023	0.20	-.012	.021	-0.58
FARMS	.005	.028	0.19	-.117 **	.036	-3.29	.001	.032	0.04
Enrollment	.003	.024	0.14	-.020	.027	-0.75	.036	.024	1.48
Highly qualified teachers	.072 **	.022	3.27	.051	.026	1.97	.088 **	.027	3.26
Minority concentration	-.068 ***	.020	-3.40	.049	.026	1.90	-.023	.026	-0.90
Cross-level interactions									
Burnout x race	-.004	.010	-0.42	.044 **	.014	3.27	.024 ^b	.013	1.81
Proportion of between-school variance explained	53.5%			50.2%			51.5%		
AIC	51431.089			51425.548			51445.79		

Note. The school organizational health dimension of burnout reflects level-2 aggregated staff-report and was modeled separately with the corresponding interaction term. Coefficients are standardized. $N=18,397$ students, $J=53$ schools. Unadjusted ICCs, Caring = .03, Equity = .04, Engagement = .04. *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$. ^b marginal significance at $p \leq .08$.

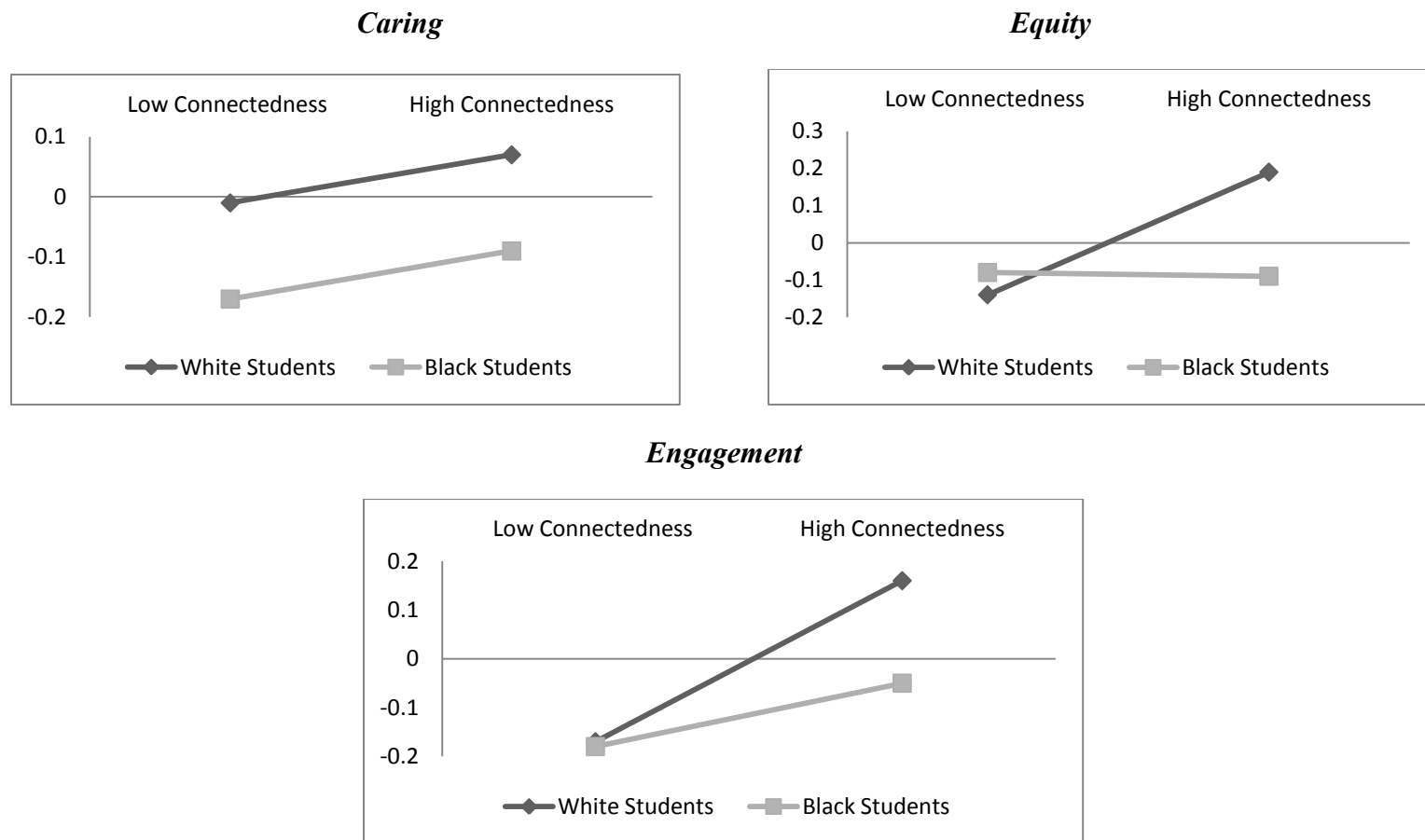


Figure 3.1. Line graphs depicting the cross-level interactions of school-level, staff-reported personal connectedness on the association between race and students' experience of caring ($p \geq .05$), equity ($p \leq .001$) and engagement ($p \leq .01$). The cross-level interactions for the outcome caring were non-significant.

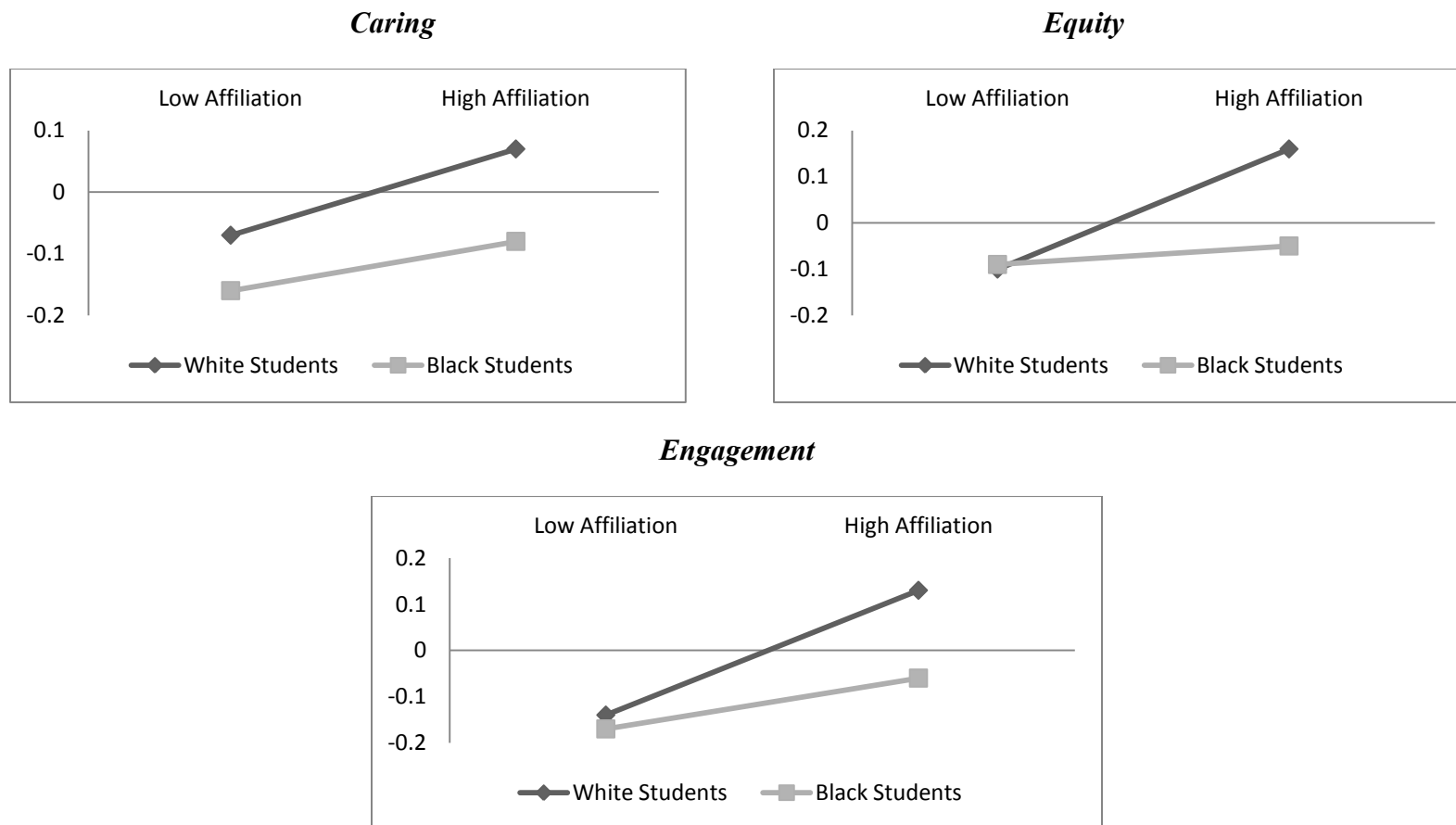


Figure 3.2. Line graphs depicting the cross-level interactions of school-level, staff-reported staff affiliation on the association between race and students' experience of caring ($p \geq .05$), equity ($p \leq .01$) and engagement ($p \leq .08$). The cross-level interactions for the outcome caring were non-significant.

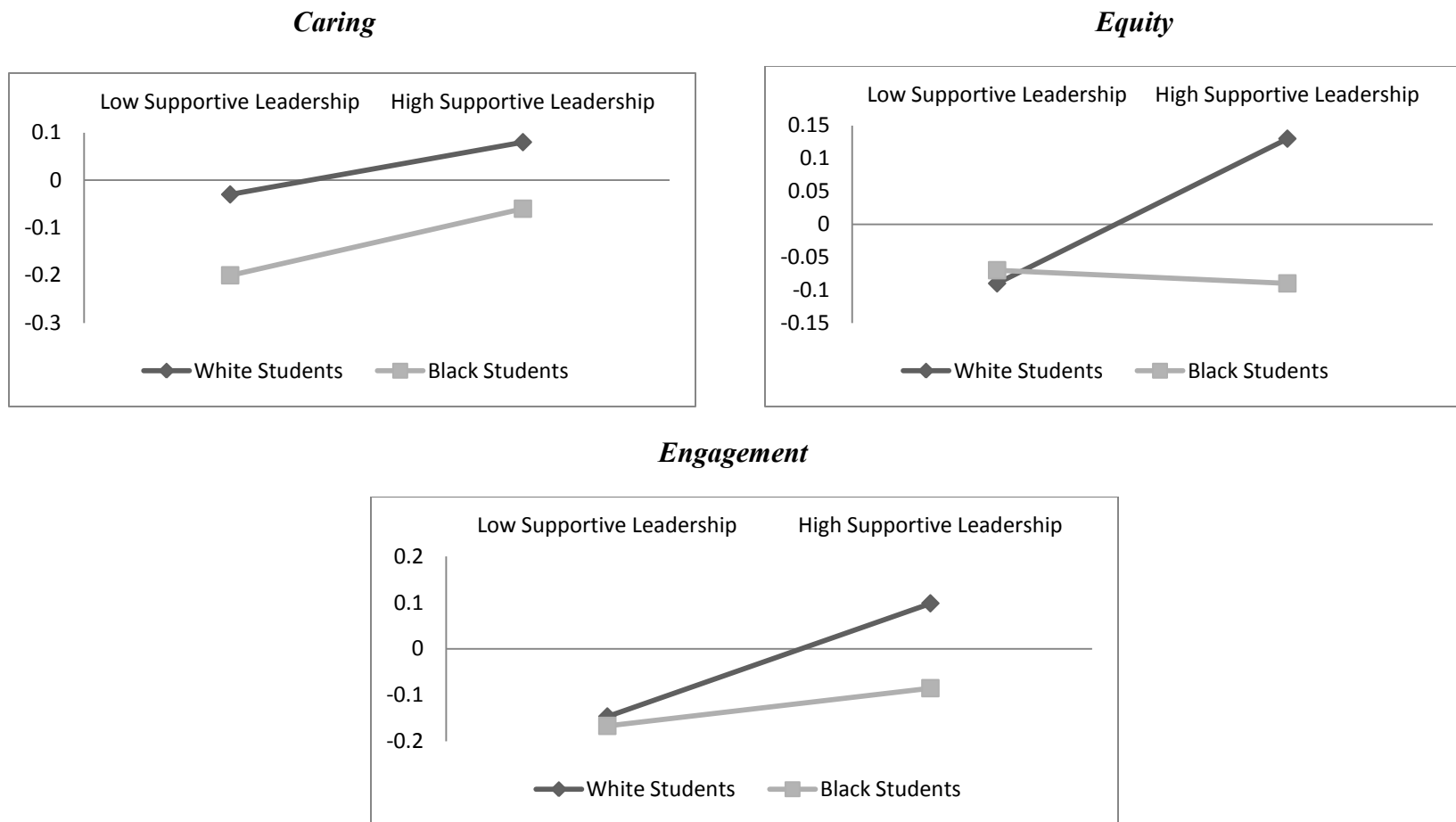


Figure 3.3. Line graphs depicting the cross-level interactions of school-level, staff-reported supportive leadership on the association between race and students' experience of caring ($p \geq .05$), equity ($p \leq .05$) and engagement ($p \leq .05$). The cross-level interactions for the outcome caring were non-significant.

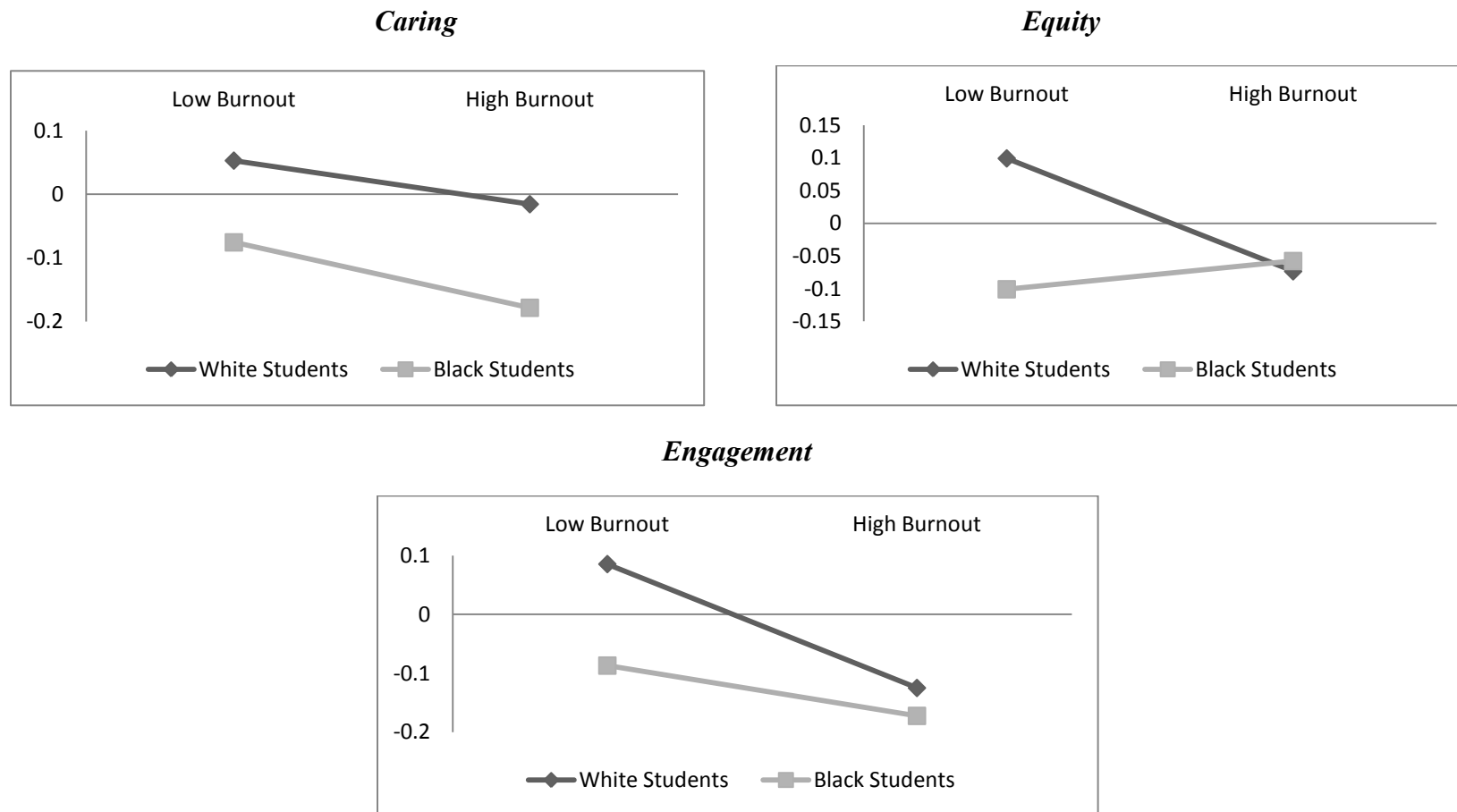


Figure 3.4. Line graphs depicting the cross-level interactions of school-level, staff-reported burnout on the association between race and students' experience of caring ($p \geq .05$), equity ($p \leq .01$) and engagement ($p \leq .08$). The cross-level interactions for the outcome caring were non-significant.

Chapter 4

Challenges in Measuring and Modeling School Discipline Disproportionality

(Manuscript 3)

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Chapter 4

Challenges in Measuring and Modeling School Discipline Disproportionality

(Manuscript 3)

Abstract

A large and growing literature documents the deleterious effects of punitive, exclusionary school discipline practices, which disproportionately affect Black youth in U.S. schools. To identify malleable school and school staff factors associated with discipline disparities – not just overall rates of disciplinary actions – we argue that research should examine explicitly the causes and consequences of discipline *disproportionality*. Recently updated state and federal guidelines for monitoring special education identification, placement, and discipline disproportionality (Bollmer et al., 2011; Roy, 2012) as mandated by federal law (IDEA, 2004) are useful references for researchers interested in examining the causes and consequences of school discipline disproportionality. This paper sought to translate these guidelines and integrate methods utilized in the peer-reviewed literature for an educational research audience with interests in school discipline disparities. We proposed a conceptual framework to guide future research and provided a case example of research illustrating the proposed methods and conceptual framework. Our case study findings revealed that disproportionate school discipline practices were linked inversely to students' perceptions of equitable treatment and cultural inclusion. The overarching goal of the paper was to advance an equity-focused and theory-driven research agenda that can better inform educators in developing, advocating for, and implementing effective policy and programmatic intervention strategies to eradicate discipline disproportionality in our schools.

Challenges in Measuring and Modeling School Discipline Disproportionality

Over the past four decades since disproportionality in school discipline was first identified (Children's Defense Fund, 1975), substantial progress has been made in our knowledge of the extent of school discipline disparities among Black, Latino, and Native American youth (e.g., Gregory & Weinstein, 2008; Kewell-Ramani, Gilbertson, Fox, & Provasnik, 2007; Krezmien, Leone, & Achilles, 2006; Vincent, Pavel, Sprague, & Tobin, 2013). A parallel line of research examining antecedents and consequences of exclusionary discipline buttresses descriptive evidence of discipline disparities by showing the persistent association between race and school punishment, even when controlling for student behavior and other factors (Bradshaw, Mitchell, O'Brennan, & Leaf, 2010; Fenning et al., 2011; Skiba, Michael, Nardo, & Peterson, 2002; Skiba et al., 2011; Wallace, Goodkind, Wallace, & Bachman, 2008). This literature also demonstrates the harmful repercussions of exclusionary discipline on youth developmental trajectories (e.g., drop-out, involvement with the juvenile justice system; Bradshaw, O'Brennan, & McNeely, 2008; Fabelo et al., 2011).

It is critical that we identify malleable school and school staff factors on which to intervene in order to reduce –not just overall rates of disciplinary actions – but discipline *disparities*. To achieve that goal, we propose that discipline disproportionality research must expand to examine explicitly the causes and consequences of discipline disproportionality. This line of inquiry has been constrained by measurement complexities and a lack of consensus in the field how to measure discipline disproportionality with validity and reliability (see Skiba et al., 2008 for a related discussion of this challenge within the special education literature). Consequently,

relatively few studies model *disproportionality* as a stand-alone predictor or outcome within multivariate analyses. Instead, simple regressions and descriptive analyses have predominated, and multivariate analyses have been restricted to variations on a base model in which race/ethnicity predicts disciplinary outcomes (Skiba, Arredondo, Karega Rausch, 2014). Moreover, no theoretical or conceptual framework of disciplinary inequity to motivate research questions exists. Such a framework is necessary to derive hypotheses regarding potential mediators and moderators. Last, as research attention shifts towards documenting discipline disproportionality among other groups such as non-heterosexual youth (Himmelstein & Bruckner, 2011; Russell et al., 2013), we will continue to explore intersections between race/ethnicity, sex, and sexual and gender identity and expression. As such, it may become more essential to model disproportionality indicators within multivariate analyses in order to facilitate these increasingly multifaceted questions.

Recently updated state and federal guidelines for monitoring special education identification, placement, and discipline disproportionality (Bollmer et al., 2011; Roy, 2012) as mandated by federal law (IDEA, 2004) are useful references for researchers interested in examining the causes and consequences of school discipline disproportionality. The guidelines cover several different strategies for calculating and assessing the significance of disproportionality, and are designed for educational administrators' use in monitoring disproportionality at state and district levels. This paper seeks to translate these guidelines and integrate methods utilized in the peer-reviewed literature for an educational research audience with interests in school discipline disparities among a range of historically marginalized groups within general or

special education. Although our focus and examples relate to racial discipline disproportionality among Black students in particular, the methods and conceptual framework are also broadly applicable to the study of discipline disproportionality based on ethnicity, sex, disability status, gender identity, and/or sexual orientation and sexual identity.

In the first section of this paper, we propose a school climate-focused conceptual framework to motivate research related to discipline disproportionality and disparate youth outcomes, including trajectories beyond school. Next, we summarize the state of the science in disproportionality measurement and provide guidance in decisions regarding selection and calculation of indices, benchmarks and methods of making comparisons, assessment of magnitude and significance, and modeling disproportionality indicators as predictors or outcomes. Finally, we present a research case study that draws upon these measurement guidelines and conceptual framework by examining discipline disproportionality as a contextual determinant of students' perceptions of inequitable school climate. Our objective is to encourage greater consistency in discipline measurement, to support educational researchers' inclusion of disproportionality indicators in their current research repertoires, and to promote research questions investigating the antecedents of school discipline disproportionality as well as its proximal and distal sequelae.

Theoretical Issues: Bidirectional, Self-Reinforcing Feedback Mechanisms

In this section, we present a conceptual framework to motivate research questions examining contributing factors and sequelae of school discipline disproportionality. The framework highlights the contributions of two key factors – school institutional and

individual staff discrimination and students' inequitable experiences of supportive school climate – to a self-perpetuating cycle of disciplinary inequity. It also links this toxic, within-school cycle to a host of consequent disparities in academic and health-related youth outcomes beyond school house doors. In a recent review of the school climate literature, Thapa and colleagues (2012) noted, “it must be understood that both the effects of school climate and the conditions that give rise to them are deeply interconnected, growing out of the shared experience of a dynamic ecological system” (p. 3). Taking this theoretical perspective, we propose the conceptual model given in Figure 4.1.

Structural inequity and bias. Although discipline disproportionality has sometimes been deflected as an issue of poverty, or simply as evidence of elevated levels of misconduct among certain student groups, research does not bear out either of these views (Bradshaw, Mitchell, O'Brennan, & Leaf, 2010; Finn & Servoss, 2013; Skiba et al., 2011; Toldson, McGee, & Lemmons, 2013; Skiba & Williams, 2014; Wallace et al., 2008). Rather, many researchers suggest that implicit institutional and individual racial and cultural assumptions may contribute to the disproportionate disciplining of youth of color, and Black males in particular (Gregory & Weinstein, 2008; Skiba et al., 2011; Vavrus & Cole, 2002; Wald, 2013). In fact, this assertion is supported by an extensive literature which suggests that youth of color and sexual minority youth experience harmful discrimination in schools (Benner & Graham, 2013; LaFromboise, Hoyt, Oliver, & Whitbeck, 2006; Le & Stockdale, 2011; McLaughlin, Hatzenbuehler, & Keyes, 2010; Tummala-Narra & Claudius, 2013). Furthermore, experimental research illustrates that people make decisions and take actions based on implicit (unconscious) biases against

these marginalized groups (e.g., Black, Latino, sexual minority individuals; Cochran, Peavy, & Cauce, 2007; Blair et al., 2013; Baron & Banaji, 2006).

These biases are likely to operate within a context of school structural inequity, which we characterize as the concentrated, overlapping disadvantages present within some schools of high suspension rates, high percentages of under-qualified teachers, and high percentages of low-income and historically marginalized students in the student enrollment. This construct is modeled after the concept of concentrated disadvantage initially posited in neighborhood research (Sampson, Earls, & Raudenbush, 1997; see Plank, Bradshaw, & Young, 2008 for another example and discussion linking neighborhood theory to school settings). Within contexts characterized by social disorder and concentrated disadvantage, teachers' stress levels are likely elevated (Collie, Shapka, & Perry, 2012); stress, in turn, has been linked to expression of implicit prejudicial biases (Kang, Gray, & Dovidio, 2013). Therefore, within the proposed framework, we frame structural inequity and bias as key causal factors triggering a negative feedback loop perpetuating discipline disproportionality.

Another line of research on culturally responsive and culturally sustaining teaching highlights how school policies and practices may be founded upon institutional biases or lack of awareness of cultural and ecological factors relevant to the communities they serve (Lee, 2011; Paris, 2012). Moreover, this research highlights how the school-student fit between historically marginalized youth and some school cultures may not be ideal to promoting positive youth outcomes (Griner & Stewart, 2013; Ladson-Billings, 1995). Recent research focused on building more equitable practices that recognize cultural and ecological differences between students, their peers, and their teachers

suggest the potential of staff training and professional development in reducing school inequity. Some of this work focuses specifically on relationship-building and culturally responsive teaching and classroom management practices (Gregory, Allen, Mikami, Hafen, & Pianta, 2013; Hersfeldt et al., 2009), while others focus on school culture and school climate (Sugai, O’Keefe, & Fallon, 2012).

Inequitable school climate. Given that a number of studies suggest that supportive school climates may reduce disciplinary sanctions in high school (Wu, Pink, Crain, & Moles, 1982; Lee, Cornell, Gregory & Fan, 2011) as well as student social-emotional and behavioral problems associated with school disciplinary contact (Gregory, Cornell, Fan, Sheras, Shih, & Huang, 2010; Griffiths, Lilles, Furlong, and Sidhwa, 2012; Henrich, Brookmeyer, & Shahar, 2005; Loukas, Suzuki, & Horton, 2006; Roeser, Eccles, & Sameroff, 2000), it makes sense to consider whether school climate may be linked to discipline *disproportionality* as well. Whereas school climate generally refers to the quality of the school social context characterized by patterns of interpersonal relations, teaching practices, norms and values, and organizational processes (Cohen, McCabe, Michelli, & Pickeral, 2009), *equitable* school climate refers to students’ full and fair *access* to resources and supports within these spheres of the school social context (Ross, 2013). Within several school climate frameworks, supports include such dimensions as emotional and physical safety, supportive high expectations from teachers, caring relationships with school staff and fellow students, opportunities for meaningful participation and engagement in the classroom and in extracurricular activities, and school culture of equity and fairness. In defining *(in)equitable* climate, we would add the importance of perceptions of personally experienced discrimination as well, based on

research linking experiences of discrimination and school climate (Benner & Graham, 2013; Stone & Han, 2005).

Most of the research linking discipline disproportionality and school climate has examined dimensions of school climate as determinants and discipline disproportionality as an outcome, while acknowledging the likelihood of a bidirectional association between school climate and discipline disproportionality (Gregory, Cornell, & Fan, 2011; Kuperminc, Leadbeater, Emmons & Blatt, 1997; Mattison & Aber, 2007; Shirley & Cornell, 2012). Less is known about this reverse association – how discipline disproportionality may be a contextual determinant of students’ perceptions of equity within the school climate. Qualitative research highlights how apparent school discipline disparities may be to students (Sheets, 1996; Howard, 2008). Some researchers suggest that students are likely to perceive discipline disproportionality as inequitable or discriminatory treatment, and that such perceptions may influence students’ experience of equitable and supportive school climate (Mattison & Aber, 2007; Ruck & Wortley, 2002).

Differential trajectories. A growing number of researchers and advocacy groups have become concerned about the *school-to-prison pipeline* (Christle, Jolivette, & Nelson, 2005; The Advancement Project, 2005). This line of research suggests that exclusionary discipline practices disproportionately experienced by Black males in particular estrange students from the learning process by deterring them from the classroom and tracking them into the criminal justice system (Darensbourg, Perez, & Blake, 2010; Nicholson-Crotty, Birchmeier, & Valentine, 2009; Skiba et al., 2002; Wald & Losen, 2007; see Skiba, Shure, & Williams, 2014 for a review). A public health

perspective highlights how these gaps contribute to health and economic disparities throughout the life course (Dankwa-Mullan et al., 2010; Freudenberg & Ruglis, 2007; Harper & Lynch, 2007; Marchbanks et al., 2013; Vernez, Krop, & Rydell, 1999). Motivated by this growing body of evidence, and given other negative outcomes associated with exclusionary discipline such as less classroom learning time (Gregory et al., 2010) and increased risk of school drop-out (Bradshaw, O'Brennan, & McNeely, 2008), we highlighted these important discipline disproportionality consequences in the proposed framework as well.

However, in this conceptual framework we also emphasize how the presence of disproportionality itself (and not only differential exposure to exclusionary discipline) may be linked to detrimental outcomes via students' *perceptions* of disproportionality in the context of an inequitable school climate. Specifically, some studies have examined links between school climate processes, perceived discrimination, and school outcomes and found that students' perceptions of school climate were significantly linked with perceived discrimination, which in turn was associated with poorer outcomes, including poorer academic performance and psychological adjustment (Benner & Graham, 2013; Stone & Han, 2005). A large literature supports the association between students' perceptions of differential treatment and discrimination by school staff and detrimental academic and behavioral outcomes among Black youth (e.g., Bingham & Okagaki, 2012; Bogart et al., 2013; Dotterer et al., 2009; Wong, Eccles, & Sameroff, 2003). Taken together, these findings suggest that discipline disproportionality may play a role in this causal chain via students' perceptions of their school's climate of (in)equity.

Methodological Issues: Key Decisions in Measuring Discipline Disproportionality

Although disproportionality seems fairly intuitive conceptually, decisions regarding its assessment are often riddled with both quantitative and interpretive issues, resulting in wide variation in its measurement and no single, agreed upon indicator of *significant* disproportionality (Skiba et al., 2008). Recently updated federal and state guidelines on special education disproportionality measurement provide comprehensive analysis and recommendations regarding the calculations of several different types of disproportionality indices, including a few newly introduced measures, such as the *e-formula* (Bollmer et al., 2011; Roy, 2012). The guidelines, while informative, are unfortunately not definitive. For example, a recent report presented to the California Department of Education analyzed seven different measures of disproportionality and three aspects of significance (frequency, severity, and persistency) before concluding that no one measure was best in all situations (Roy, 2012). This conclusion speaks to the complexity of the task that educators face in monitoring disproportionality in their schools.

Indices. Studies focused on racial disparities in school discipline typically have modeled the association between race as a predictor and disciplinary sanctions as an outcome, at times adjusting for various school-, class-, and student-level covariates. In these studies, whether this association is *disproportionate* has been determined in myriad ways. Studies have used indicators of disproportionality such as risk ratios (Hosp & Reschly, 2003), odds ratios and adjusted odds ratios (Bradshaw, Mitchell, O'Brennan, & Leaf, 2010; Skiba et al., 2011), incident rate ratios (Vincent, Swain-Bradway, Tobin, & May, 2011), regression coefficients (Shirley & Cornell, 2011), and relative and absolute

differences in composition indices (Gregory & Weinstein, 2010; Skiba et al., 2002). The different indicators reference various types of outcome data (e.g., counts of disciplinary sanction events or students with a history of one or more disciplinary sanctions) and are meaningful in comparison to different benchmarks. To formulate possible research questions and to select appropriate measures to address these questions, it is important to have an initial understanding of four main indices that have been used in assessing discipline disproportionality.

Composition. One of the main distinctions conventionally highlighted in the literature on special education disproportionality is between *risk* and *composition* disproportionality indices. As applied to discipline disproportionality, the *composition* index reflects the racial and ethnic make-up of students with a given disciplinary sanction. In other words, the composition index is the proportion of students' with a given disciplinary sanction who are from a given racial or ethnic group (e.g., the percent of all suspended students that are Black. As displayed in Table 4.2., the *composition* index is calculated as B_S / T_S (see Table 4.1. for 2 x 2 table defining notation used in all formulas). Among all the indices utilized to calculate disproportionality, many consider the composition index to be the most intuitive and obvious measure of disciplinary inequity (Skiba et al., 2008). However, one technical limitation of the composition index is that it is susceptible to the diversity of the student population, such that it becomes less informative as student populations become more racially and ethnically homogenous (Bollmer et al., 2011). Thus, it is not an informative measure of disproportionality in schools or school districts that lack racial or ethnic diversity.

Risk. The *risk* index, on the other hand, reflects the probability within a racial ethnic group of receiving a disciplinary sanction. Specifically, the risk index is the proportion of students within a given racial or ethnic group that received a disciplinary sanction (e.g., the percent of all Black students that were suspended). As shown in Table 4.2., the risk index is calculated as B_S / T_B . Because it lacks a benchmark, the risk alone provides a less obvious snapshot of the inequitable distribution of disciplinary outcomes on the one hand. A strength of this index, however, is that it assesses the *chances* a student within a group of interest has of receiving a given disciplinary sanction. One limitation of the risk ratio measure is that it may become unstable with small *ns* (Hosp & Reschly, 2004). In addition, the risk is sensitive to the school (or school district's) event rate in the education category (e.g., the school's suspension rate) such that higher rates contribute to higher risks (Bollmer et al., 2011).

Odds. The *odds* is another measure that is often used, and in certain circumstances can be appropriately used to estimate risk (i.e., with more rare disciplinary events like expulsion). The odds refers to the number of students within a given racial or ethnic group that received a disciplinary sanction relative to the number of students within a given racial ethnic group that did *not* receive that disciplinary sanction. The odds is calculated as B_S / B_{NS} (see Table 4.2.). Some have suggested that the odds may provide a more stable estimate than the risk because it includes both students who are and are not within a certain education status (Finn, 1982; see Skiba et al., 2008). However, odds are difficult to understand directly and are less intuitive than composition and risk. Moreover, epidemiologists commonly note that odds ratios only provide a mathematically accurate estimate of relative risk when the prevalence of the outcome of

interest is rare; when the prevalence is high, odds ratios are known to exaggerate the relative risk (Davies, Crombie, & Tavakoli, 1998). Therefore, it may be misleading to use the odds in calculating an estimate of relative risk in studies utilizing more common disciplinary events, such as office disciplinary referrals. Suspension has also become an increasingly common disciplinary tactic over the past several decades (Losen & Skiba, 2010).

Incidence. The three indices described above – composition, risk, and odds – feature numbers of students in the numerator; the *incidence*, the last estimator of risk we will discuss is calculated with number of disciplinary events in the numerator. The incidence represents the rate of disciplinary events among students of a given racial/ethnic background per a given unit of time (e.g., days, months, school year). As shown in Table 4.2., assuming the counts are disciplinary events and not students, the incidence is calculated as $[(B_S / T_B) / \text{Unit of time}]$. It is noteworthy that the previous three indices provide proportions or probabilities, whereas the incidence provides a true rate. As noted in a recent disproportionality study utilizing the incidence (Vincent et al., 2011), the incidence provides a rate that allows comparisons across schools with different enrollment sizes and racial and ethnic compositions. In addition, if the unit of time is days, the incidence also accommodates differences between schools in the number of instructional days per year.

In summary, each index addresses a different question, but all can be calculated and utilized to assess disproportionality relative to an agreed upon benchmark. The example of an assessment of one or more of out-of-school suspensions among Black

students is used in Table 4.2. to clarify the differences in the meaning and calculation of the composition, risk, odds, and incidence.

Benchmarks. Although each of these indices is informative, they only meaningfully convey disproportionality relative to some other expected proportion or rate. In fact, disproportionality is essentially defined as the extent to which the representation of a group in a category (e.g., out-of-school suspensions) differs from an agreed upon benchmark for that group (Skiba et al., 2008). Therefore, the prior four indices described are only the first element of the calculation of disproportionality. Without a comparison group in the calculation, the relative directionality, meaning, magnitude, and significance of the disproportionality cannot be quantified. Therefore, the selection of a benchmark for comparison is a critical next step in assessing disproportionality, and lack of consensus in this area represents one of the main sources of variation in disproportionality measurement.

Methods of comparison. Not only is there lack of consensus on appropriate benchmarks, but there are also different basic methods for making comparisons. Specifically, the two main approaches assess *relative* versus *absolute* differences between the index of interest and the agreed upon comparison. *Relative* differences are essentially ratios of the ratios, and mathematically involve *division* of the index characterizing the discipline exposure of the racial or ethnic group of interest by a comparison index. *Absolute* differences are remainders of ratios, and mathematically involve *subtraction* of a comparison index from the index characterizing discipline exposure among the racial or ethnic group of interest.

Although there is little indication that one method of comparison yields objectively more accurate or improved assessment of discipline disproportionality, relative methods of comparison seem to generate the most easily understood picture of a given school or school district's discipline disproportionality since it places the risk in proportion to another benchmark. The relative approach is nearly always used with risk, odds, and incidence indices, resulting in *risk ratios*, *odds ratios*, and *incidence ratios* – sometimes collectively referred to as measures of *relative risk*. These measures can stand alone as continuous indicators of disparate risk (the higher the number, the greater the risk to the group of interest) and have been used to make comparisons between schools and school districts in regard to their magnitude of disproportionality. There is more variability in the method of comparison used with the composition index; however, generally the same basic principles apply.

Composition index benchmarks. The standard benchmark for the composition index (which represents, for instance, the percent of suspended students who are Black) is the percent of Black students in the total enrollment of a school or school district. That is, one would expect, all else being equal, that the racial and ethnic distribution of students who have received a disciplinary sanction should mirror the racial and ethnic distribution of students in the larger population. If these distributions are markedly different, it is suggestive of an inequitable, unbalanced, or unfair distribution of school discipline, and may be indicative of potential civil rights violations requiring monitoring and intervention. Some researchers contend disproportionality should be primarily measured utilizing differences in composition because this method most plainly reflects equity or inequity in disciplinary outcomes, whereas differences between measures of

relative risk can be harder to interpret in regards to inequity and/or do not as readily signify racial and ethnic fairness in school discipline practices.

Risk, odds, and incidence benchmarks. Whereas there is agreement on the reference group for the composition index, there is no consensus on the appropriate comparison group for measures of relative risk (Skiba et al., 2008). The two choices typically debated are whether to compare the racial or ethnic group of interest to White students or to all other students in the population who are not from the racial or ethnic group of interest. Federal guidelines for monitoring disproportionality recommend utilizing ‘all other’ students as the comparison group (Bollmer et al., 2011), with the rationale that this allows for disproportionality of White students to be calculated. In addition, using ‘all other’ students sometimes mitigates a problem with zero cells or small cell sizes (which preclude calculation altogether or lead to instability in the estimators, respectively). However, educators mandated by law to monitor disproportionality are bound by different legal requirements and assumptions than academic researchers interested in discipline disproportionality and potential targets for intervention. Given our responsibility as researchers to formulate empirically testable hypotheses guided by critical theory and existing evidence, we believe a more theoretical discussion of the appropriate benchmark in measures of relative risk is merited.

The key question at hand is which group’s risk provides an “accurate” benchmark for how much risk is appropriate among the racial and ethnic group of interest.

Presumably, as mounting evidence suggests the harmful consequences for students of exclusionary discipline exposure (Skiba, Shure, & Williams, 2014), one would hope for a very low risk of disciplinary sanctions among all students and reasonably consider setting

some low level of risk as a benchmark pertinent to any and all student groups. However, overall disciplinary sanction rates vary between classrooms, schools, school districts, geographic locations, and states, in part due to policies that are beyond the control of teachers and administrators at a given setting-level. Therefore it makes sense to choose another student group's risk within the same or a proximal unit of comparison as a benchmark in order to control for these confounding influences outside the locus of control of that setting. Yet, in choosing another student group's risk within the school as a benchmark, we come head to head with a fundamental tension, and that is that the risk we *ideally* want for comparison is the *counterfactual* risk (Maldonado & Greenland, 2002). The counterfactual risk would allow us to estimate the "true" risk in a student group with all else being equal *except* the defining characteristic in question. For example, the counterfactual risk in a study of the association between Black race and out-of-school suspension is the risk of suspension among Black students *if they were not Black*. As the counterfactual risk is impossible to estimate, the debate centers on whether the risk among White students or 'all other' students is the next best approximation.

In public health, researchers often make comparisons between case and control or treatment and intervention groups with the underlying causal hypothesis being that some exposure increases or reduces the risk of a given detrimental outcome. Applying the same basic principal to the disciplinary sanction as an unfavorable outcome, one could hypothesize that racial and ethnic group membership functions as a proxy for exposure to racial and ethnic discrimination (whether implicit or not) among certain groups, and that this exposure in school settings may increase that student groups' risk of receiving a punitive, exclusionary disciplinary sanction. Indeed, as we describe in greater detail in

the section on Theoretical Issues, quantitative and qualitative evidence exists in good measure to suggest that youth of color and other historically marginalized youth experience harmful discrimination in schools (e.g., Benner & Graham, 2013). Therefore, we contend that studies examining discipline disparities that include such populations in the reference group seem likely to confound a hypothesized association of exposure to discrimination and risk of discipline sanctions. Specifically, when including other marginalized groups in the reference for a relative risk measure, it is likely to *attenuate* the association.

Other arguments against using ‘all other’ students as the benchmark is that patterns of discipline exposure among Latino students in particular have been inconsistent in disproportionality research. While Latino students’ overrepresentation in disciplinary outcomes has been found in some studies (Raffaele Mendez & Knoff, 2003; Skiba et al., 2011), this finding has been more equivocal (Gordon, Della Piana, & Keleher, 2000; Skiba et al., 2000; Skiba & Rausch, 2006). Although researchers are still examining the causes of discrepant findings between studies, some have noted different patterns by grade-level as a possible contributing factor (Skiba et al., 2011). Until we understand these discrepancies better, we have no way to adjust for variation this may contribute to disproportionality findings among Black students when including ‘all other’ students as a benchmark, particularly in regions where there may be higher percentages of Latino students. Moreover, we suggest inconsistency in the reference group chosen across studies again may compound the issue of variability in disproportionality findings among Latino students. Specifically, if the racial and ethnic composition includes a high percentage of Black students in the enrollment, and Black students are included within

the reference group when calculating disproportionality for Latino youth, this may attenuate any finding of disproportionality among Latino students. For these reasons, we suggest that White students' risk be utilized as the default comparison estimate for purposes of assessing disproportionality when the hypothesized association is between exposure to racial or ethnic discrimination and disciplinary sanctions.

Table 4.3. displays a summary of this discussion of benchmarks with notes about comparison groups, names of different measures, and sample formulas with the suggestion of utilizing White student groups as the benchmark for relative risk measures. Although we do not discuss it in depth here, we anticipate a similar logic may apply in studies examining disproportionality by sex (where males may have greater exposure to gender discrimination in the context of discipline than females) and by gender and sexual orientation/identity (where lesbian, gay, bisexual, transgender, queer, questioning, intersex, and cisgender [LGBTQ] youth may have greater exposure to discrimination in the context of school discipline than non-LGBTQ youth).

Alternative calculations to handle zero-cells. Technical issues related to zero cells and small cell sizes limit the ability to calculate relative risk. To navigate these complexities, federal and California state guidelines have made recommendations regarding the use of *alternate risk ratios* and *weighted risk ratios*, both of which draw upon data from the broader setting level (i.e., from classroom to school, from school to school district, or from school district to state). The alternative risk ratio was among the highest rated measures of disproportionality in the California state guidelines (Roy, 2012) for its ease of use and utility for comparisons across school districts. It is a simple calculation, the same as the risk ratio calculation, but the numerator features the risk

among a target student group at a *school* whereas the denominator is the risk among the benchmark group ('all students') at the school-*district* level. This could also be applied to classroom in the numerator and school in the denominator, or school district in the numerator and state in the denominator. The alternative risk ratio is advised for use in limited circumstances, such as when schools have small numbers of students in one or more racial groups (Bollmer et al., 2011). Similarly, the weighted risk ratio is for use in narrow circumstances and also uses an approach that borrows information from the broader setting. Specifically, it weights the risks in the numerator and denominator by the racial and ethnic composition from the larger setting from which the sample was drawn. However, it is a much more complicated calculation and is quite difficult to interpret; therefore we do not advise use of this measure. A full discussion of these approaches is beyond the scope of this paper (see the California guidelines [Roy, 2012] for details on both of these formulas).

Assessing magnitude and significance. Once the index and benchmark have been selected, the next and last critical decision point in disproportionality measurement is the assessment of the meaning and significance of the discipline disproportionality. *Significance* of discipline disproportionality has typically been assessed using another set of steps including calculation of 10%-of-population proportion (Reschly, 1997) and other formulations of standard errors and confidence intervals (Hosp & Reschly, 2003), chi-square test statistics (Gregory & Weinstein, 2010), and other typical regression test statistics (i.e., *p*-values when running multivariate regressions). However, we suggest in the following sections that, in large-scale research in which the unit of comparison is the classroom, school, or school-district, when modeling discipline disproportionality as a

predictor or an outcome variable, it is unnecessary to statistically test for significant disproportionality of each indicator; rather, it is only necessary to understand how to interpret the directionality of the estimate and to set relevant measures' thresholds for severity.

Composition significance. Although there is near total consensus regarding the appropriate comparison group for the composition index, there is only emerging agreement on how to assess the significance of relative or absolute differences in composition. Researchers have noted that there is not an inherent criterion for assessing when a difference in composition indices is meaningful (Coutinho & Oswald, 2004). For example, if Black students represent 10% of the student population and 13% of all suspended students, is this a statistical artifact? Or is it a meaningful difference that signifies inequitable school discipline, and therefore merits intervention? Initially, some researchers suggested utilizing a 10% proportion-of-population confidence interval (CI) around the composition estimate to define the range beyond which disproportionality could be considered significant for either under- or over-representation (Reschly, 1997). However, this approach has scaling issues and becomes less useful as the school's diversity decreases (i.e., approaching 100% White or 100% Black enrollment; Westat, 2003, 2005).

An alternative to the confidence interval approach, the *e-formula*, has been used to indicate significant disproportionality by the State of California for the purposes of making legal decisions since the 1970s (Roy, 2012), and was recently added to the federal guidelines on measuring disproportionality (Bollmer et al., 2011). The *e-formula* represents an estimate of the maximum "tolerance" for the proportion of a specific group

(e.g., Black students) within an education category (e.g., out-of-school suspensions). As described here with regard to discipline disproportionality, the intent is for use in measuring the magnitude of *over*-representation only. The formula is based on the crude composition of Black students in the general population, plus an error term. In reference to Table 4.1., using the example of Black students, the *e-formula* is

$$E_B = A_B + SE_B$$

$$\text{where } A_B = T_B / T_{ALL}$$

$$\text{and where } SE_B = \sqrt{((A_B (1 - A_B)) / T_S)}$$

The second component in the *E-formula*, “ $\sqrt{((A_B (1 - A_B)) / T_S)}$ ”, is comparable to the standard error of the sampling distribution of the proportion of a racial/ethnic group with the given disciplinary sanction. This is a unique feature that sets the e-formula apart from other strategies for assessing significance because it adjusts for differences in the racial and ethnic composition of the school (or school district), therefore facilitating comparisons across schools (or school districts). State and federal guidelines do not strictly set the number of standard errors beyond which a school is considered to have statistically significant disproportionality, however there is a suggestion that more than 3 standard errors is a reasonable threshold (Bollmer et al., 2011; Roy, 2012).

The e-formula is an important advance in discipline disproportionality measurement with implications for large-scale studies designed to examine the antecedents and consequences of discipline disproportionality across classrooms, schools, or school district (in contrast to research examining discipline disproportionality in a sample of students). Specifically, binary, ordinal, and/or continuous disproportionality indicators can be set utilizing the e-formula to characterize a school setting for

comparison in a study sample. For a binary indicator, one could dummy code a variable, setting the “maximum tolerance” threshold (in this case, to greater than or equal to 4 standard errors) above the basic tolerance level set in A_B for overrepresentation as follows:

$$1 \text{ if } C_B \geq A_B + 4*SE_B$$

$$0 \text{ if } C_B < A_B + 4*SE_B.$$

where C_B is the composition index previously described.

Although in this example, we selected four standard errors, it may be appropriate based on one’s research question and the magnitude of severity of interest to set the binary variable threshold to another level. A similar logic applies for creating an ordinal variable, which could be dummy coded from 1 to 10 based upon the number of standard errors exceeded, such that the higher the score, the greater the magnitude of disproportionality. Last, continuous variables could be created by dividing or subtracting (creating relative or absolute composition differences). For example, one could subtract the e-formula for maximum tolerance for Black racial composition (set to one standard error in this case) from the actual composition measure of disproportionality for each school such that as the proportion of suspended students who are Black in excess of the maximum tolerance increases, so does the magnitude of over-representation

$$C_B - E_B.$$

Modeling composition (over-representation) as a predictor or an outcome.

Although this does not “test” the significance of composition index difference relative to the enrollment composition benchmark, it allows one to quantify or otherwise indicate the level of severity of school discipline disproportionality and then to make comparisons between settings or model regressions using these indicators with standard statistical

methods (assuming, of course, an adequate sample size of classrooms, schools, or school districts). Specifically, if one includes a composition indicator (binary, ordinal, or relative/absolute difference) as a predictor in a multivariate model, the essential point to understand for subsequent interpretation of the model is that, as the predictor increases, the degree of over-representation increases. Likewise, if the composition indicator is included as an outcome, standard test statistics within multivariate models can indicate whether predictors are significantly associated with a disproportionality outcome.

Relative risk significance. With relative risk, there are similar concerns regarding how to ascertain whether the disproportionality is meaningful. Specifically, even though a ratio of Black students' suspension risk relative to the risk in a reference group exceeding 1.0 would technically suggest unfavorable discipline disproportionality (excessive risk), there is no consensus about a meaningful threshold for significance. For example, should the relative risk threshold for meaningful or significant disproportionality be set to 1.25, 1.4, 2.0 or anywhere in between? Some researchers have employed chi-square test statistics (Gregory & Weinstein, 2010) to examine the significance of a singular relative risk measure, while in non-academic settings others have suggested arbitrary cut-points like 1.5 for consistency (e.g., within a school district; Montgomery County Schools, 2009). However, federal guidelines do not provide any kind of absolute criteria for significant disproportionality in regards to risk ratios (Westat, 2004, 2005; Bollmer et al., 2011).

Modeling relative risk as a predictor or an outcome. Fortunately, as with composition measures in large-scale research, it is not necessary to determine the statistical significance of the singular measure of disproportionality when employing

these indicators in multivariate analyses. For research in which the relative risk is used as a predictor, a similar approach to that with composition measures could be used to characterize a school by its degree of discipline disproportionality, and then test for significant associations with a hypothesized outcome (e.g., student-perceived discrimination), knowing that as the relative risk indicator increases (once it is above the 1.0 threshold), the magnitude of the excess risk in the target group also increases. Below the 1.0 threshold, from zero to .99, it is an indication of *lower* risk relative to the reference group. Similarly, the measure of relative risk can stand alone as an outcome indicator of discipline disproportionality, utilizing standard test statistics within multivariate analyses.

In summary, in this discussion of assessing discipline disproportionality significance, we have underscored the importance of understanding the relevant thresholds in applying the e-formula to composition measures and understanding the meaning of risk, odds, and incidence ratios less than or greater than 1.0. We have also emphasized the implications of recent advances in disproportionality measurement as they relate to the research exploring the antecedents and consequences of discipline disparity in large-scale samples. We now present a case study to illustrate an application of the theoretical framework and measurement guidelines discussed heretofore.

Case Study: Discipline Disproportionality and Inequitable School Climate

In the following case study, we draw upon the conceptual framework and methods described above by exploring associations between perceived school equity and school discipline disproportionality. To explore this association, we first characterized 47 schools based on their degree of disproportionality utilizing six different indicators

(relative risk and composition) calculated from school-reported out-of-school suspension data from the U.S. Department of Education Office of Civil Rights. Then, in a series of hierarchical linear models using HLM 7 (Raudenbush & Bryk, 2002), we examined whether discipline disproportionality was inversely associated with student ratings of the schools' climate of equity, among Black ($N=5,831$) and White ($N=10,053$) high school students. We modeled each discipline disproportionality predictor separately and hypothesized that significant, inverse associations would be found across all of the models.

Measures. Anonymous, cross-sectional student report data for this analysis were collected online in spring 2013 as part of the Maryland Safe and Supportive Schools Initiative (MDS3). We generated a school-level file with out-of-school suspension data disaggregated by race and ethnicity from the 2009-2010 school year from the publicly available Civil Rights Data Collection (CRDC; U.S. Department of Education, Office of Civil Rights, 2013; data from the 2011-12 school year were released in March 2014). Student-report data was available for all 58 schools in the study; however, schools with little racial diversity (i.e., almost all Black or all White schools) either generated zero-cells or extreme outliers for the relative risk measures, a common problem previously discussed. This was also a problem for schools with a very low number of suspensions overall (suspension rate $<3\%$). Therefore, 11 schools were dropped from the analyses, limiting our study sample to 47 schools. Nonetheless, the school level sample size was still adequately powered to address the proposed research question.

Count data of students with one or more out-of-school suspensions were aggregated by gender and disability status and then used to calculate three measures of

relative risk (*risk ratio*, *odds ratio*, *alternative risk ratio*) as well as three composition measures based on the *e-formula* (*binary*, *ordinal*, *absolute difference*) at the school-level, following steps previously described. Other school-level indicators were obtained from the Maryland State Department of Education for the school year, including school enrollment, suspension rate, percentage under-qualified teachers (as indicated by less than advanced professional certification), percentage of enrollment comprising Black students, and percentage of students receiving free or reduced price meals (FARMs), which has been shown to be good marker for low household income (Ensminger et al., 2000). To capture the construct of *concentrated disadvantage*, we followed an approach from the literature on neighborhood contexts that has been used to characterize an environment by its level of concentrated disadvantage (Sampson, Raudenbush, and Earls, 1997) by calculating a factor regression score in Stata 11 that weighted each of the latter four variables by its factor loading.

Students in participating high schools completed the MDS3 School Climate Survey (Bradshaw, Waasdorp, Debnam, & Lindstrom Johnson, in press) which included an *equity* scale (Debnam et al., 2013). The scale is comprised of 4 items and had a Cronbach's alpha (α) of .83. Three items focused on students' perceptions of equitable treatment based on race, gender, and socioeconomic status (e.g., "At this school, students of all races are treated the same") and one item focused on cultural inclusiveness ("The school provides instructional materials that reflect my culture"). All response options were on a 4-point Likert scale from *disagree strongly* (1) to *agree strongly* (4), with higher scores indicating more equity. Students also responded to a series of questions regarding demographic characteristics, including age, gender, maternal education level

(higher score signifies more education), and race and ethnicity, which were included in this study. Students were asked about their sense of *racial belonging* by responding on a four-point Likert-type scale to indicate their agreement with the statement, “I have a strong sense of belonging to my own racial/ethnic group.” Because research suggests measures of racial identity are found to be protective in many ways, while also increasing students’ vulnerability to experiencing discrimination (Williams, 2014), this variable was included as student-level demographic covariate.

Results. Although the magnitude and significance of the association between the various indicators of discipline disproportionality and perceived school equity varied slightly, with one non-significant finding for the alternative risk ratio, our central hypothesis that a negative association between disproportionality and perceived school equity held in the majority of the models. Specifically, in Table 4.4. the risk ratio and the odds ratio were both significantly associated at the $p < .05$ level, with γ ranging from $-.038$ to $-.041$, indicating that setting-level discipline disproportionality among Black relative to White students was negatively associated with students’ perceptions of school equity. The composition (*e-formula*-based) indicators in Table 4.5. had stronger, negative associations with student perceptions of equity, relative to the relative risk estimates. The model using the *e-formula* binary predictor suggests that when Black over-representation among suspended students met or exceeded the maximum tolerance (set at 4 standard errors over the percent of Black students represented in the overall student enrollment), there was a $-.056$ point decrease in students’ perceptions of equity ($p \leq .001$). The *e-formula* ordinal and absolute difference predictors similarly suggested a significant, negative impact of Black overrepresentation among suspended students on students’

experience of school equity ($\gamma = -.041, p=.002$ and $\gamma = -.043, p=.006$ respectively). The e-formula based models also explained a greater proportion of the between-school variance in student-perceived equity, suggesting that composition disproportionality indicators may more closely correspond with perceptible disciplinary inequity. This makes sense given many researchers' suggestion that composition indices are more intuitive markers of inequitable distribution of school discipline sanctions. In addition to these significant findings, the construct of concentrated disadvantage (a factor score that included high suspension rates) stood out as a strong, significant predictor of student-perceived school equity, a finding that merits further research.

One implication of this pattern of findings is that discipline disproportionality may be apparent to students, and when it is, it may adversely affect students' perceptions of school climate, and equitable school climate in particular. Furthermore, our findings align with assertions that the discipline gap is likely related to discriminatory or biased treatment of Black students. Of course, we cannot infer from this study's results that discriminatory treatment of Black youth is an underlying cause of discipline disproportionality; however, the findings suggest that students may see discipline disparities this way, which may have important consequences for school climate and youth outcomes, regardless of what may be objectively fueling discipline disparities. Factor analyses and internal consistency reliability of the scale indicate that the items tap a construct reflecting the fair and inclusive treatment of all students at school; however, only one item references equal treatment by race in the school. Therefore, this scale does not thoroughly capture racial climate or racial inequity specifically. Future research may explore the use of indicators that draw upon this specific dimension of equity.

Student demographic associations with perceptions of school equity were stable across each of the six models (see Tables 4.4. and 4.5.). In each model, Black race was not significantly associated with perceived equity ($\gamma = -.028$, p ranged between .124 and .131). In light of prior findings on disparate perceptions of equity by race with this data set (Bottiani et al., under review), this was an unexpected finding. The difference may be due to reduced power to detect a significant difference given the smaller sample sizes of Black and White students in the current study. Students' sense of racial belonging, however, was significantly associated with perceived equity (γ ranged from .187 to .188, $p \leq .001$), such that a one-point increase in racial belonging was associated with almost .19 point increase in perceived equity. This contradicts other literature suggesting racial identity indicators may engender greater vulnerability to perceived discrimination, however this was only a one-item, one-dimensional indicator of racial belonging, and more importantly, we did not distinguish these processes among Black relative to White students in this analysis. The analyses controlled for other student-level differences such as male sex, socioeconomic status (maternal education), and age.

Conclusions

The proposed methods and conceptual frame of research proposed and demonstrated in this paper are consequential to our understanding of discipline disproportionality as a harmful, self-reinforcing feedback loop within the school social context. Because we were able to replicate our finding of a significant, negative association between students' perceptions of equity with the majority (five) indicators of disproportionality, even when controlling for a number of relevant student- and school-level factors, it seems likely that there is an association between students' perceptions of

equity and racial disproportionality in school discipline sanctions, as we proposed in the conceptual framework. However, one measure of disproportionality had no significant association with student-perceived equity – the alternative risk ratio. This is particularly noteworthy because, in contrast to other relative measures of risk used in our study, the alternative risk ratio comparison group was ‘all other’ students (i.e., all non-Black students; whereas the other relative risk indicators used White students as the comparison group). It seems plausible that this choice of benchmark for comparison may have attenuated the association between the indicator and student-perceived school equity.

Although the associations between disproportionality and student-perceived equity were quite modest, this may be due in part to a few factors related to our equity measure and differences in data collection time points. In regard to the equity scale we used, factor analyses and internal consistency reliability of the scale indicate that the items tap a construct reflecting the fair and inclusive treatment of all students at school. However, only one item referenced equal treatment by race in the school, and it is plausible stronger associations would be found with richer measures of equity that included dimensions related to racial climate. Moreover, the number of years between when the discipline data were collected and when the student climate survey data were collected (i.e., three years), suggests that a similar analysis with more closely aligned time points may uncover even stronger associations.

The fact that we still did find significant associations reflects research which suggests that rates of disparity remain fairly stable over time (Noltemeyer & McLoughlin, 2010). Although we were not able to examine discipline disproportionality among other historically marginalized groups (i.e., Latino and American Indian students)

as a contextual predictor, it is important to examine whether these findings are replicated when the disproportionality indicators represent disciplinary disparities among these groups.

Overall, our focus on examining disproportionality as a discernible contextual influence that affects students' experience of equitable school climate is novel and fills a gap in our knowledge regarding the detrimental effects of discipline disproportionality. Our findings shed light on discipline disproportionality as a reflection of inequitable school climate and highlight the importance of future research examining discipline disproportionality as a contextual determinant of equitable school climate and related student outcomes. On the whole, we conclude that, given the limitations inherent in disproportionality measurement, research utilizing discipline disproportionality within multivariate analyses should employ multiple disproportionality indicators when possible. By taking a joint measures approach to disproportionality, reflecting both composition and risk approaches, researchers may internally replicate (and therefore enhance the validity) of their findings.

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Table 4.1.

“Two by two” table for example comparisons between Black and White students’ suspensions

Racial Group	Suspended	Never Suspended	<i>Totals by Racial Group</i>
Black	B_S	B_{NS}	T_B
White	W_S	W_{NS}	T_W
<i>Totals by Suspension Status</i>	T_S	T_{NS}	T_{ALL}

Table 4.2.

Summary table of four key indices for use in calculating school discipline disproportionality

Index	Formula	Example Question	Notes
Composition	B_S / T_S	What proportion of all suspended students is Black?	Considered the most intuitive, easily understood index.
Risk	B_S / T_B	What proportion of all Black students was suspended?	May become unstable with small <i>ns</i> .
Odds	B_S / B_{NS}	What is the ratio of suspended to non-suspended Black students?	Only an accurate estimator of risk when the outcome is rare.
Incidence	$(B_S^{\mathbb{F}} / T_B) / \text{time}$	At what rate are Black students suspended each day?	Facilitates comparisons across schools which differ by enrollment size, racial ethnic composition, and number of school days.

Note. ^ℱFor the incidence formula only, the numerator is number of disciplinary events, whereas for the other three measures, the numerator is number of students.

Table 4.3.

Summary of discipline disproportionality stand-alone measures, key terms, and formulas

Index	Relative	Absolute	Comparison and Notes
Composition	Composition ratio	Absolute composition difference	Composition of the racial or ethnic group in the total student enrollment
<i>Example formula</i>	$(B_S/T_S) / (T_B/T_{ALL})$	$(B_S/T_S) - (T_B/T_{ALL})$	<i>Formula for comparison with White students</i>
Risk	Risk ratio (RR)	Absolute risk difference	Typically compared to the index among White students or all other racial or ethnic group(s)
<i>Example formula</i>	$(B_S/T_B) / (W_S/T_W)$	$(B_S/T_B) - (W_S/T_W)$	<i>Formula for comparison with White students</i>
Odds	Odds ratio (OR)	<i>Uncommon</i>	Could be compared to the index among White students or all other racial or ethnic group(s)
<i>Example formula</i>	$(B_S/B_{NS}) / (W_S/W_{NS})$	$(B_S/B_{NS}) - (W_S/W_{NS})$	<i>Formula for comparison with White students</i>
Incidence	Incidence ratio (IR)	Absolute risk reduction	Could be compared to another or all other racial or ethnic group(s) OR to the same racial or ethnic group during another time period
<i>Example formula</i>	$[(B_S/T_B) / \text{Time}] / [(W_S/T_W) / \text{Same unit of time}]$	$[(B_S/T_B) / \text{Time}] - [(W_S/T_W) / \text{Same unit of time}]$	<i>Formula for comparison with White students</i>

Table 4.4.

Associations of student-perceived school equity with relative risk measures of disproportionate out-of-school suspension among Black students

	School Equity								
	Risk Ratio			Odds Ratio			Alternate Risk Ratio		
	γ	SE	t ratio	γ	SE	t ratio	γ	SE	t ratio
Student-level variables									
Black race	-.028	.018	-1.55	-.028	.018	-1.55	-.028	.018	-1.56
Racial belonging	.187 ***	.010	19.08	.187 ***	.010	19.09	.188 ***	.010	19.10
Maternal education	.021 *	.009	2.22	.021 *	.009	2.21	.020 *	.009	2.14
Age	-.018	.010	-1.79	-.018	.010	-1.79	-.018	.010	-1.81
Male	.027 **	.009	2.81	.027 **	.009	2.82	.027 **	.009	2.83
School-level variables									
Study group	.000	.016	-0.01	-.003	.016	-0.19	-.003	.017	-0.20
School size	-.007	.017	-0.40	.001	.019	0.07	.007	.020	0.34
Concentrated disadvantage	-.144 ***	.019	-7.67	-.136 ***	.018	-7.75	-.119 ***	.018	-6.68
Disproportionality indicator	-.041 *	.016	-2.51	-.038 *	.017	-2.25	-.015	.017	-0.85
Proportion of between-school variance explained		55.17%			55.13%			49.83%	
AIC		44650.4			44650.7			44654.3	

Note. Coefficients are standardized. $N=15,876$ students, $J=47$ schools. Unadjusted ICC = .024. The adjusted models' -LL all significantly differed from the null model -LL at the $<.001$ level. *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$.

Table 4.5.

Associations of student-perceived school equity with e-formula composition indicators of disproportionate out-of-school suspensions among Black students

	School Equity								
	E-formula Binary			E-formula Continuous			E-formula Ordinal		
	γ	SE	t ratio	γ	SE	t ratio	γ	SE	t ratio
Student-level variables									
Black race	-.028	.018	-1.56	-.028	.018	-1.56	-.028	.018	-1.56
Racial belonging	.187 ***	.010	19.10	.188 ***	.010	19.09	.187 ***	.010	19.10
Maternal education	.021 *	.009	2.21	.021 *	.009	2.23	.021 *	.009	2.21
Age	-.018	.010	-1.78	-.018	.010	-1.80	-.018	.010	-1.79
Male	.027 **	.009	2.82	.027 **	.009	2.81	.027 **	.009	2.81
School-level variables									
Study group	.003	.015	0.21	-.004	.016	-0.28	-.005	.016	-0.32
School size	.013	.017	0.72	.001	.017	0.06	.020	.018	1.06
Concentrated disadvantage	-.130 ***	.017	-7.54	-.130 ***	.018	-7.32	-.125 ***	.017	-7.32
Disproportionality indicator	-.056 ***	.016	-3.55	-.041 **	.012	-3.26	-.043 **	.015	-2.87
Proportion of between-school variance explained	63.89%			56.46%			50.13%		
AIC	44645.1			44649.7			44654.1		

Note. Coefficients are standardized. $N=15,876$ students, $J=47$ schools. Unadjusted ICC = .024. The adjusted models' -LL all significantly differed from the null model -LL at the $<.001$ level. *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$.

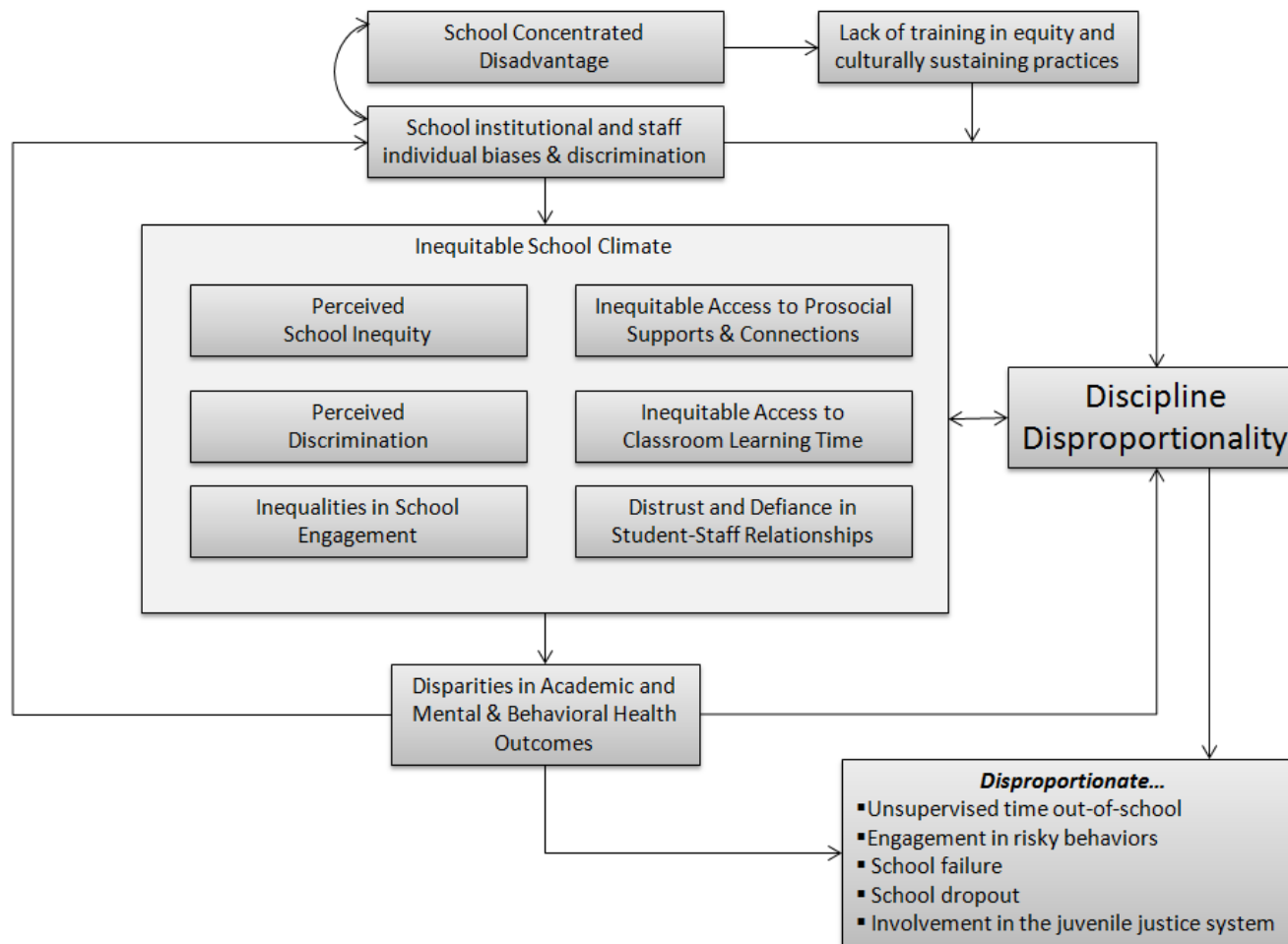


Figure 4.1. Theoretical framework depicting the bidirectional, self-reinforcing feedback loop that is theorized to perpetuate and exacerbate school discipline disproportionality. School concentrated disadvantage includes school-level indicators like high percent of student enrollment eligible for free and reduced price meals, high percent of under-qualified teachers, high suspension rates, and high levels of racial and ethnic segregation (representing segregation in school community).

Chapter 5
Racial Inequalities in High School Discipline Practices:
Links with Perceived Peer Relations and Externalizing Problems
(Manuscript 4)

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Chapter 5

Racial Inequalities in High School Discipline Practices: Links with Perceived Peer Relations and Externalizing Problems (Manuscript 4)

Abstract

Black students disproportionately experience exclusionary, punitive discipline sanctions in U.S. schools, including office disciplinary referrals, suspensions, and expulsions. Separate lines of research collectively suggest that disproportionate experiences of school exclusion may divert Black youth onto detrimental developmental trajectories (i.e., increasing risk for school drop-out and subsequent involvement in the juvenile justice system). One gap in this literature is research examining whether racial disproportionality in school discipline is associated with racial differences in students' perceptions of peer relations and externalizing problems. Employing multilevel methods, this study characterized 47 high schools by their degree of discipline disparity utilizing a measure of relative risk of out-of-school suspension among Black compared to White students. We then explored whether setting-level discipline disproportionality interacted with racial gaps in student-reported peer connectedness, prosocial friendship formation, and emotional adjustment (externalizing problems). More disproportionate disciplinary contexts were associated with larger racial disparities in students' perceived peer relations and externalizing problems. Our findings have implications for educational reform to reduce the discipline gap and increase support for positive developmental outcomes among Black youth.

Racial Inequalities in High School Discipline Practices: Links with Perceived Peer Relations and Externalizing Problems

Studies examining demographic correlates of school discipline exposure have overwhelmingly found that Black students receive office discipline referrals, suspensions, and expulsions at higher rates (Krezmien, Leone, & Achilles, 2006; Skiba et al., 2011; Vincent, Tobin, Swain-Bradway, & May, 2011; Wallace, Goodkind, Wallace, & Bachman, 2008). Findings suggest that Black students are subject both to greater frequency and severity of sanctions (Skiba, Michael, Nardo, & Peterson, 2002; Skiba & Peterson, 2000). Higher rates of disciplinary sanctions for Black youth have been found even with similar levels of misbehavior as their White peers (Finn & Servoss, 2013; Skiba et al., 2002; Toldson, & Lemmons, 2013), and even when controlling for teacher ratings of behavior (Bradshaw, Mitchell, O'Brennan, & Leaf, 2010) and other potentially confounding factors such as poverty (Skiba et al., 2011) or socioeconomic status (Wallace et al., 2008).

Based on this research, there is a growing consensus that discipline disproportionality is not simply a reflection of elevated student misconduct among Black youth, as some have argued (see Skiba & Williams, 2014 for a review of this debate). Rather, numerous studies have concluded that implicit racial biases and cultural assumptions embedded within the school social context are a likely culprit, leading to discriminatory school discipline practices that distinctly disservice Black youth, and Black males in particular (Ferguson, 2001; Gregory & Weinstein, 2008; Skiba et al., 2011; Vavrus & Cole, 2002; Wald, 2013). However, these two central hypotheses – that discipline disproportionality is either a reflection of school racial bias *or* a reflection of

real differences in student functioning – are not diametrically opposed to one another. Indeed, there is evidence to support both hypotheses (Gregory, Skiba, & Noguera, 2010; Skiba et al., 2002; Shirley & Cornell, 2012); rather, it seems likely that bidirectional, mutually reinforcing processes are at play.

Research examining students' perceptions of discipline disproportionality provide insight into one potential pathway mediating these bidirectional processes. Students indicate that school discipline disparities are very apparent to them (Sheets, 1996, Howard, 2008), and Black students in particular are sensitive to discrimination within teacher interactions and disciplinary actions (Ruck & Wortley, 2002). School climate research has identified significant linkages between students' school perceptions and discipline disproportionality. Emerging research has examined how dimensions of school climate may predict discipline disparities, suggesting a reciprocal association between climate (particularly school racial climate) and disproportionality (i.e., Gregory, Cornell, & Fan, 2011; Kuperminc, Leadbeater, Emmons & Blatt, 1997; Mattison & Aber, 2007; Shirley & Cornell, 2012). A recent multilevel study explored this reciprocal association and found that multiple indicators of objectively-measured, racially disproportionate school disciplinary contexts were significantly, inversely associated with Black and White students' perceptions of equitable school climate (Bottiani, Bradshaw, Mendelson, in preparation). Taken together, evidence supports the likelihood that racial discipline disproportionality is perceived by students as inequitable and discriminatory, which may contribute to a more negatively valenced school racial climate.

Compelling evidence indicates that perceived school inequity and discrimination are detrimental to positive developmental outcomes among youth of color. Specifically,

a number of studies have found that students' perceptions of differential treatment and discrimination by school staff play a role in poorer academic, social-emotional and behavioral outcomes among Black youth (e.g., Bogart et al., 2013; Wong, Eccles, & Sameroff, 2003) and deter student engagement (Bingham & Okagaki, 2012; Dotterer et al., 2009). On the other hand, research has found that perceptions of school equity promote academic motivation and school belonging (Debnam, Lindstrom Johnson, Waasdorp, & Bradshaw, in press) – dimensions that are particularly salient to Black students' emotional engagement and psychological adjustment at school (Bottiani, Bradshaw, & Mendelson, under review). Therefore, it is plausible that disproportionate disciplinary contexts are particularly injurious to Black youths' social and emotional wellbeing at school. However, no research to date has quantitatively examined discipline disproportionality as a contextual moderator of racial gaps in students' social or emotional outcomes.

The Current Study

Extensive research documents the harmful effects of punitive, exclusionary school discipline exposure, including increased risk of subsequent contact with the juvenile justice system (Fabelo et al., 2011) and school drop-out (Bradshaw, O'Brennan, & McNeely, 2008). Researchers typically suggest that discipline disproportionality is harmful to Black youth because it differentially deprives Black youth of classroom learning time. Our study builds on this literature by suggesting a distinct pathway through which discipline disproportionality may exert its deleterious effects – that is, by exposure to racially inequitable treatment within the school social context. In this paper, we explore whether racially disproportionate disciplinary contexts disparately

marginalize Black students within school settings from prosocial peers and exacerbate disparities in emotional adjustment relative to White students. Our central research question is whether setting-level discipline disproportionality is differentially associated with students' perceptions of peer relations and emotional functioning by race. To assess this research question, we first characterized 47 schools based on their degree of disproportionality utilizing a measure of Black students' relative risk of out-of-school suspension (compared to White students' risk; Bottiani, Bradshaw, and Mendelson, 2014). Then, we examined cross-level interactions to determine whether racially disproportionate disciplinary contexts were associated with poorer student ratings of peer connectedness, prosocial friendships, and externalizing problems among Black relative to White students. We hypothesized that significant cross-level interactions would be found, such that disproportionate disciplinary contexts would exacerbate racial gaps in students' report of peer connectedness, prosocial friendships, and externalizing problems, even when modeling a number of other student-level (e.g., perceived school equity, socioeconomic status, racial belonging) and school-level (e.g., school size, concentrated disadvantage) factors. This research has potential to inform policy advocacy efforts and programmatic targets to mitigate the injurious effects of school discipline disproportionality.

Method

School-level demographic data for the 2012-13 school year was obtained from the Maryland State Department of Education (MSDE). Out-of-school suspension data disaggregated by race and ethnicity from the 2009-2010 school year was obtained from the Civil Rights Data Collection (CRDC; U.S. Department of Education, Office of Civil

Rights, 2013). Anonymous, cross-sectional student report data for this study were collected online as part of the Maryland Safe and Supportive Schools Initiative (MDS3) in spring 2013. More information on this initiative and data collection procedures are given by Bradshaw, Waasdorp, Debnam, and Lindstrom Johnson (in press). Data analyses were approved by the researchers' Institutional Review Board.

Participants

The sample included 15,876 students in 47 suburban and rural Maryland public high schools. Although equity data was available for 58 schools, disproportionality calculations utilizing disciplinary data from the CRDC limited the school sample for this study to 47 schools. Specifically, risk ratio calculations for schools with little racial diversity (i.e., almost all Black or all White schools) either generated zero-cells or extreme outliers. This was also a problem for schools with very low number of suspensions overall (suspension rate <3%). Therefore we dropped these 11 schools from the analysis. The student sample was further limited to include only Black ($N=5,831$) and White ($N=10,053$) students for the purpose of this study. The resulting student sample was 36.7% Black and 50.0% male. An average of 338.0 students per school (median: 305.5, range: 117 – 1207) provided data for the study.

The total school enrollment ranged from 323 to 2240 students ($M = 1267.7$, $SD = 480.1$). Of note, the average risk of suspension among Black relative to White students was 2.48 ($SD=1.2$). The percentage of staff with less than advanced certification ranged from 14.3 to 58.7% ($M = 34.8$, $SD = 10.7$). The percentage of students receiving free or reduced-price meals (FARMs) ranged from 9.4 to 70.4% ($M = 39.8$, $SD = 17.1$). From the CRDC, the number of students receiving one or more out-of-school suspensions per

school ranged from 40 to 795 ($M=271.6$, $SD=180.3$). From the MSDE, the average school suspension rate was 19.3% ($SD=12.0$), and ranged from 3.7 to 59.2%. Additional demographic characteristics of students and schools are presented in Table 5.1.

Measures

Student (level 1). Students in participating high schools were asked to complete the MDS3 School Climate Survey (Bradshaw, Waasdorp, Debnam, & Lindstrom Johnson, in press). All response options were on a 4-point Likert scale from *disagree strongly* (1) to *agree strongly* (4), with higher scores indicating higher levels of the construct. Cronbach's alphas are provided as indicated by (α).

Equity. The *equity* scale ($\alpha=.83$; Debnam et al., 2013) was utilized to assess students' perceptions of school equity and cultural inclusion. The scale is comprised of 4 items and had a Three items focused on students' perceptions of equitable treatment based on race, gender, and socioeconomic status (e.g., "At this school, students of all races are treated the same") and one item focused on cultural inclusiveness ("The school provides instructional materials that reflect my culture").

Peer relations. The *prosocial friendships* scale ($\alpha=.64$) was comprised of three items measured that measured students' affiliation with prosocial peers (e.g., "My friends try to do what is right"). The *peer connectedness* scale ($\alpha=.87$; Bradshaw et al., in press) included four items that measured students' connection to their peers at school (e.g., "I feel like I belong" and "Students help each other").

Externalizing problems. Last, the *externalizing problems* scale ($\alpha=.81$; Bradshaw et al., in press) was comprised of four items that measured the frequency of a student's externalizing problems (e.g., "I get mad easily") on a four-point Likert scale from almost

always to never. These items were adapted from the BASC-2 (Reynolds & Kamphaus, 2004).

Demographics. Students also responded to a series of questions regarding demographic characteristics, including age, gender, socioeconomic status (SES; i.e., maternal education level, with higher score signifies more education and higher SES), and race, which were included in this study. Students were asked about their sense of *racial belonging* by responding on a four-point Likert-type scale to indicate their agreement with the statement, “I have a strong sense of belonging to my own racial/ethnic group.” Because research suggests measures of racial identity are found to be protective in many ways, but also increase students’ vulnerability to experiencing discrimination (Lee Williams, Tolan, Durkee, Francois, & Anderson, in press), this variable was included as student-level demographic covariate.

School (level 2). School discipline data from the Office of Civil Rights CRDC includes data disaggregated by race and ethnicity, disability status, and gender on a number of disciplinary outcomes for the 2009-10 school year for each of the 47 schools included in the study. For our purposes, count data of students with one or more out-of-school suspensions were aggregated by gender and disability status to calculate a measure of *relative risk* (ratio of Black students’ risk of out-of-school suspension relative to White students’ risk). Note that, although the U.S. Department of Education Office of Special Education Programs advises that ‘all others’ serve as the denominator in disproportionate risk calculations, the research literature appears to find either Whites or ‘all others’ as an acceptable index group (Skiba, Poloni-Stuadinger, Simmons, Feggins, & Chung, 2005), with some indication of a preference for White students as the reference (see Bottiani et

al., in preparation, for a discussion). Other school-level indicators were obtained from the Maryland State Department of Education for the school year, including school enrollment, suspension rate, percentage under-qualified teachers (as indicated by less than advanced professional certification), percentage of enrollment comprising Black students, and percentage of students receiving free or reduced price meals (FARMs), which has been shown to be good marker for low household income (Ensminger et al., 2000). To represent these correlated aspects of the school environment parsimoniously, we followed an approach from the literature on neighborhood contexts that has been used to characterize an environment by its level of *concentrated disadvantage* (Sampson, Raudenbush, & Earls, 1997). Specifically, we calculated a factor regression score in Stata 11.0 that weighted each of the latter four variables by its factor loading.

Overview of Analyses

Missing data. After dropping 11 schools with inadequate discipline data from the CRDC (as previously described) and further limiting the sample to Black and White students who provided sufficient demographic information (age, gender, and maternal education), descriptive analyses found very little missing data in the student outcomes (<1% of students failed to report on one or more of the items from the outcome measures). As a result, the reason for missingness was judged to be random after adjusting for observed covariates (Rubin, 1976; student level demographics included in the model), and we assumed data were missing at random (MAR; Arbuckle & Wothke, 1999). HLM 7 software was used in the multilevel analyses, which adjusts parameter estimates for attrition using maximum-likelihood (REML) estimation, an appropriate means of handling missing data assumed to be MAR (Schafer & Graham, 2002).

Multilevel modeling. We used a multilevel approach to examine our central hypothesis that discipline disproportionality would exacerbate racial gaps in students' report of peer connectedness, prosocial friendships, and externalizing problems. We fit linear hierarchical models and generated standardized coefficients. The outcomes were measured at the student level (level 1). Level-1 predictors were race (dummy coded Black relative to White), perceived equity, age, gender, SES, and racial belonging, based upon preliminary analyses showing associations with the outcomes. Any level-1 covariates with non-significant variances were fixed (Hox, 1995; Raudenbush & Bryk, 2002) and grand-mean centered; those with significant variances were allowed to randomly vary and were group-mean centered (Croninger, 2013). At level 2, in addition to the relative risk of school suspension among Black compared to White students, we included total student enrollment, a dummy indicator for study group (intervention or control), and the concentrated disadvantage weighted factor score. All level 2 variables were grand mean centered. All coefficients presented in the results are standardized. Only the coefficients and test statistics from the final estimations of fixed effects with robust standard errors are presented.

Results

Individual- and School-Level Influences on Peer Connectedness

In Table 5.2., findings are presented on models examining peer connectedness, prosocial friendships, and externalizing problems. The first model on the left, which examines peer connectedness, suggests that Black students experience less belonging and connection to their peers at school relative to White students ($\gamma = -.038, p < .001$), even after adjusting for a host of other individual-level factors, including perceived racial

belonging, socioeconomic status (maternal education level), age, and gender. Older students were also significantly less likely to experience student connectedness relative to younger students ($\gamma = -.041, p < .001$). Racial belonging ($\gamma = .104, p < .001$), maternal education level ($\gamma = .024, p = .003$), male gender ($\gamma = .134, p < .001$), and perceived school equity ($\gamma = .460, p < .001$) were all significantly positively associated with students' sense of belonging and connection to their peers.

At the school-level, neither study group nor school size predicted students' perceptions of connectedness to peers; however, students in schools characterized by high levels of concentrated disadvantage reported feeling less connected to their peers than students in schools with less concentrated disadvantage ($\gamma = -.141, p < .001$). There was no main effect of discipline disproportionality on perceived connectedness to peers ($\gamma = .004, p = .852$); however, when examining differences by race, a significant difference in the impact of school disproportionality on Black relative to White students was found ($\gamma = -.021, p = .015$). The cross-level interaction between school discipline disproportionality and racial inequalities in students' peer connectedness is depicted visually in Figure 5.1. Discipline disproportionality was negatively associated with Black students' sense of peer connectedness, whereas it was positively associated with White students' connectedness; therefore the disparity was exacerbated, as hypothesized. In other words, in schools without or with low discipline disproportionality, disparities in White and Black students' experience of connectedness were minimal; however, in schools marked by high levels of racial inequity in school discipline exposure, disparities in peer connectedness emerged.

Individual- and School-Level Influences on Prosocial Friendships

A second model, presented in the center columns of Table 5.2., examines students' report of affiliation with prosocial peers. The findings suggest that there is no significant difference between Black and White students in their affiliation with prosocial peers ($\gamma = -.016, p=.185$), when school discipline inequity is not taken into consideration. Older students were significantly more likely to report prosocial friendships relative to younger students ($\gamma = .048, p<.001$). Racial belonging ($\gamma = .127, p<.001$), maternal education level ($\gamma = .117, p<.001$), and perceived school equity ($\gamma = .267, p<.001$) were all significantly positively associated with students' reported affiliation with prosocial peers. Males had lower report of affiliations with prosocial peers compared to females ($\gamma = -.155, p<.001$),

At the school-level, neither study group nor school size appear to influence students' prosocial affiliations. Again, we found that concentrated disadvantage had a significant, negative association with students' report of prosocial friendships ($\gamma = -.036, p<.013$), although the magnitude and significance level of the association was not as marked as it was with perceived peer connectedness. There was no main effect of school discipline disproportionality on prosocial friendships ($\gamma = .021, p=.096$); however, when examining differences by race, a significant impact of school disproportionality on Black students was found ($\gamma = -.024, p=.042$). As displayed in Figure 5.2., disproportionality was significantly associated with a larger racial gap, such that the prosocial friendship slope declined among Black students between low to high disproportionality schools, whereas the slope inclined among White students. Therefore, in schools without or with low discipline disproportionality, disparities between White and Black students' prosocial

affiliations were negligible; however, in schools marked by high levels of racial inequity in school discipline exposure, disparities emerged.

Individual- and School-Level Influences on Externalizing Problems

In the columns on the right side of Table 5.2., we present findings from a model examining students' report of externalizing problems. The findings indicate that there is a significant difference between Black and White students in their self-perceptions of externalizing problems ($\gamma = .093, p < .001$), such that Black students report greater levels of externalizing problems than White students do. Students' perceptions of school equity were negatively associated with externalizing problems ($\gamma = -.214, p < .001$). Although racial belonging and gender were not associated with externalizing problems ($\gamma = -.002, p = .817$), other demographic characteristics were associated. Students' who reported having mothers with higher levels of education reported lower levels of externalizing problems ($\gamma = -.148, p < .001$). Older students reported lower levels of externalizing problems than younger students ($\gamma = -.038, p < .001$).

The school-level covariate of school size was not associated with externalizing, however the study group was ($\gamma = .037, p = .008$). Concentrated disadvantage was negatively associated, as expected, such that students in schools characterized by high levels of concentrated disadvantage reported higher levels of self-perceived externalizing problems ($\gamma = .081, p < .001$). Again, there was no main effect of school discipline disproportionality on students' externalizing ($\gamma = -.012, p = .313$); however, a significant cross-level interaction was found ($\gamma = .032, p < .001$), such that disparities between Black and White students' self-perceived externalizing problems were exaggerated in schools marked by high levels of racial inequity in school discipline exposure, as hypothesized

(see Figure 5.3.). Although disparities in White and Black students' externalizing were substantive even in low disproportionality schools, such that Black students had higher levels of externalizing problems, the graph illustrates this disparity is significantly greater in schools set apart by high levels of school discipline disproportionality.

Discussion

A large and growing literature documents the harmful effects of exclusionary school discipline practices, which disproportionately affect Black youth in U.S. schools. Most research in this area examines the direct, detrimental effects of removal and exclusion from school and classroom environments while noting the differential use of these practices with Black youth (e.g., Fabelo et al., 2011). Our study highlights an additional pathway by which discipline disproportionality may have damaging affects for Black youth: specifically, via negative social and emotional aspects of functioning associated with exposure to inequitable treatment within the school social context. To explore this hypothesis, we characterized schools utilizing an objective indicator of Black students' disparate risk of out-of-school suspension and examined how differences between Black and White students' perceptions of peer connectedness, prosocial friendships, and externalizing problems varied by schools' degree of disproportionality. Our study findings shed light on how school inequalities may perpetuate racial disparities in youth developmental outcomes and have implications for future research, policy advocacy, and educational practice aimed at reducing the school discipline gap.

Disproportionate Disciplinary Contexts

Our findings indicate that school discipline disproportionality is associated with racial gaps in several key markers of social and emotional wellbeing. As hypothesized,

inequalities in Black and White students' sense of connectedness to peers, prosocial affiliations, and externalizing problems emerged in schools with greater racial disparities in out-of-school suspensions, suggesting that Black students fare more poorly in schools marked by inequitable discipline practices, even when controlling for students' socioeconomic status, among other demographic characteristics, and schools' degree of concentrated disadvantage. These results point to a number of different lines of inquiry for further exploration.

For example, one interpretation of these findings is that inequity in school discipline practices is perceived as discrimination by Black youth. This assertion is supported by an extensive literature which suggests that youth of color and other marginalized groups (e.g., sexual minorities) experience harmful discrimination in schools (Benner & Graham, 2013; LaFromboise, Hoyt, Oliver, & Whitbeck, 2006; Le & Stockdale, 2011; McLaughlin, Hatzenbuehler, & Keyes, 2010; Tummala-Narra & Claudius, 2013) and that Black youth are likely to perceive discrimination in regard to teacher treatment and school disciplinary practices (Ruck & Wortley, 2002). This possible mediating mechanism of perceived discrimination would explain the less favorable ratings of externalizing problems given by Black relative to White students in highly disproportionate schools. Specifically, our findings are consistent with the large extant literature on the developmental consequences of experiences of discrimination in adolescence. Most of these studies focus on internalizing outcomes, and find that adolescents who perceive more racial or ethnic discrimination also report more psychological distress, low self-esteem, and depression (e.g., Benner & Kim, 2009; Brody et al., 2006; Grossman & Liang, 2008; Prelow, Danoff-Burg, Swenson, &

Pulgiano, 2004; Seaton, Caldwell, Sellers & Jackson, 2010); however, some studies have also identified significant associations between discrimination and externalizing behaviors (Bogart et al., 2013).

A recent study highlights that the source of perceived discrimination – societal, school staff, or peer – influences the type of negative outcomes that ensue (Benner & Graham, 2013). Specifically, Benner & Graham found that experiences of *peer discrimination* was linked more with psychological maladjustment, *societal discrimination* (within neighborhoods) was more related to increased racial awareness, and *school staff discrimination* was more associated with negative academic outcomes (Benner & Graham, 2013). A social-cognitive perspective on bias suggests the possibility that racially disproportionate discipline practices evoke perceptions of discrimination coming from *all* sides – from societal structures, school staff, and peers. Specifically, theory on social bias suggests that people evoke different responses from their social environment by their phenotypic characteristics, including race, sex, and age (i.e., characteristics outside their locus of control), depending upon their socially conferred status (Bandura, 1999). Schools with racially disproportionate discipline practices may confer a certain social status or stigma to Black youth that in turn make them more subject to biased decisions and behavior from both peers and staff. These biases may in turn affect their own conceptions of themselves, their actions, and their global perceptions of the school's racial climate in ways that hinder prosocial development, and in turn, perpetuate biases.

In this way, inequitable disciplinary contexts could negatively influence Black students' perceptions of peer interactions with non-Black youth, and indeed, non-Black

peers may be more inclined to treat Black peers in discriminatory ways within disproportionate disciplinary contexts. This could explain in part why Black youth reported lower levels of peer connectedness (i.e., that peers help, trust, respect, and like each other) in schools with greater discipline disproportionality. It could also explain our finding that Black youth reported higher levels of externalizing problems in schools with greater discipline disproportionality, given research suggesting that psychological maladjustment is a particularly salient outcome of perceived peer discrimination (Benner & Graham, 2013). Moreover, Black youth in disproportionate disciplinary climates may develop identities in concert with Black peers that are antagonistic to prosocial norms of the mainstream culture (Fordham & Ogbu, 1986), which may explain why Black youth self-reported that their friends were prosocial at lower levels in schools with greater discipline disproportionality. Future research should identify the mediating role of perceived peer discrimination in the association between disproportionate discipline practices and racial disparities in peer relations and externalizing problems.

Similarly, disproportionate discipline practices may be perceived by Black youth as a form of structural, societal inequity, which in turn may raise racial stigma to conscious awareness among Black students within that context (Benner & Graham, 2013). As such, it is plausible that disproportionate disciplinary contexts prompt responses during disciplinary encounters akin to stereotype threat – that is, “the arousal, worrying thoughts, and temporary cognitive deficits evoked in situations where a group member’s performance can confirm the negative stereotype about their group’s ability in that domain” (Rydell, Rydell, & Boucher, 2010, p. 885). A classroom disciplinary interaction may trigger stereotype threat more readily in highly disproportionate schools,

which in turn could escalate the disciplinary encounter, resulting in a disciplinary sanction issued by a teacher, whereas the encounter may not unfolded with this outcome in the absence of the stereotype threat being activated. Most research on stereotype threat among Black individuals suggests the effects are primarily relevant to academic performance (Steele & Aronson, 1995; Steele, Spencer, & Aronson, 2002), however research on stereotype activation and behavior has generally shown that people behave in ways consistent with the stereotype (Wheeler & Petty, 2001). The possibility for activation of stereotype threat during the classroom disciplinary interaction within disproportionate disciplinary contexts is thus one potential avenue of future research suggested by this study's findings.

Some emerging research on school racial climate and racial identity processes has underscored the importance of person-context fit as it relates to intrinsic academic motivation and achievement (Byrd & Chavous, 2011, 2012) among Black youth. Racial identity and racial climate (person-context) congruence may also have implications for social and emotional outcomes. In our study, racial belonging (an aspect of racial identity related to centrality; Sellers et al., 1998) was strongly and significantly associated with students' social and emotional outcomes. As such, it is possible that discipline disproportionality exerts a harmful influence by negatively affecting Black students' sense of racial belonging (as well as other aspects of racial and social identity formation). It is important to point out that these dynamics likely vary depending upon the racial and ethnic diversity of the school (considering staff and student racial and ethnic heterogeneity as well as the percent of same-ethnicity peers and staff; Benner & Graham, 2013). Unfortunately, because calculations of discipline disproportionality are influenced

by the racial and ethnic composition of that context (Bottiani et al., in preparation), it makes it difficult to disentangle the mathematical relative to the substantive theoretical linkages between school diversity and school disproportionality. However, research examining interracial relationships and person-context fit within high disproportionality schools may be one way of exploring these various hypotheses.

All of these potential mediating mechanisms represent intriguing pathways for future inquiry related to the consequences of school discipline disproportionality. As we have noted, we view these processes as likely bidirectional. More deliberate research measuring both student reported data and discipline disproportionality rates at both time points is needed to better establish temporality and therefore contribute to this discussion of causality. Research specifically attending to perceived inequity or perceived discrimination (specified by source) as a mediating mechanism between school discipline disproportionality and disparate social and emotional outcomes among Black youth is an important next step in this line of research. In addition, it is vital for future research to examine contextual influences of discipline disproportionality among other historically marginalized groups (i.e., Latino and American Indian students).

Implications for School Reform Efforts

Although the degree of schools' concentrated disadvantage (high suspension rates, percentages of under-qualified teachers, percentage of low SES and Black students enrolled) was strongly associated with prosocial outcomes in this study, this aspect of the school social environment may not be particularly malleable to school-level reform efforts. Students' experiences of equitable and supportive school climate, on the other hand, may be an important point of intervention for school administrators, teachers, and

school counseling staff to consider, given research suggesting that school climate is malleable to intervention (Bradshaw, Koth, Thornton, & Leaf, 2009; Koth, Bradshaw, Leaf, 2008). Although we were not able to test perceived school equity as a mediator in this study, prior research with this data demonstrated significant associations between student perceived equity and a number of disproportionality indicators (Bottiani et al, in preparation). In this study, in turn, we found strong, statistically significant associations between student-perceived equity and prosocial outcomes, which suggests that more equitable school climates enhance prosocial outcomes among students as a whole. This supports prior research on school equity indicating that perceived equitable climate may be an important mediating mechanism in students' positive developmental outcomes (Debnam et al., 2013).

In addition to focusing on students experiences of equitable climate, other research suggests the importance of striking a balance between having highly structured disciplinary and behavioral expectations *and* being highly supportive of students (i.e., warm demander or authoritative schools). When school climate was characterized by the presence of both structure and support, smaller racial gaps in student disciplinary outcomes were found (Gregory et al., 2011). This prescription is consistent with multicultural educational literature suggesting that school practices and student-teacher relationships characterized by a warm, demanding style (caring combined with high expectations) may be more culturally responsive and culturally sustaining for Black students (Gay, 2002; Ladson-Billings, 1995). Investing in school staff professional development to promote more equitable and authoritative school climate is likely key to

reducing both discipline disproportionality and its detrimental consequences for Black students' social emotional wellbeing.

Some early research examining the effects of professional development and coaching interventions for teachers to support their skills in equitable and culturally sustaining classroom practices are promising (Bradshaw et al., in preparation; Gregory, Allen, Mikami, Hafen, & Pianta, 2014). For example, My Teaching Partner (Gregory et al., 2014) is a personalized coaching intervention that provides systematic feedback and student-teacher classroom interactions. The intervention focuses in part on diversifying instructional formats and increasing problem-solving during instruction, and has demonstrated increases in student behavioral engagement relative to a control group (Gregory et al., 2014). A second intervention approach, called Double Check, is a school-wide professional development series and targeted teacher coaching model. Both components of the intervention focus on building teacher skills in *CARES* – Curricular connections to culture, *Authentic* relationship-building, *Reflective* thinking, *Effective* communication, and *Sensitivity* to students' culture. Preliminary analyses indicated significant increases in teacher cultural responsiveness and multicultural self-efficacy, as well as reductions in office disciplinary referrals among Black youth, following the intervention (Bradshaw et al., in preparation).

Limitations and Strengths

There are a few limitations of our study that justify caution in the interpretation of our findings. One feature of our study that has both advantages and drawbacks is the fact that three years elapsed between the collection of discipline data and collection of student climate survey data were collected. A potential threat to validity in our study is that the

degree of discipline disproportionality may have changed during this time lapse. However, research indicates that rates of disproportionality remain fairly stable over time (Noltemeyer & McLoughlin, 2010). The fact that we still did find significant associations suggests that a similar analysis with more closely aligned time points may uncover even stronger interactions. An advantage of using disproportionality data from an earlier time point is that it is an improvement over cross-sectional data only. Although we cannot draw causal inferences from these analyses, the fact that the disproportionality data was collected prior somewhat tempers the strength of claims stating that the reverse of our hypothesis – that Black students’ poorer peer relations and greater externalizing problems predict higher rates of discipline exposure – is just as likely to be true. Despite its limitations, the study was methodologically rigorous in that it included a large sample size, integrated multiple data sources, and employed multi-level modeling to handle the nested structure of the data. In addition, although the student data were self-reported, disproportionality estimates were generated from an independent data source with objective counts of discipline infractions disaggregated by race. Therefore, we are able to make inferences that meaningfully contribute to our understanding of how disproportionate disciplinary contexts may contribute to racial inequalities in students’ school experiences.

Conclusion

This study explored an important gap in our knowledge regarding the associations of school discipline disproportionality with racial disparities in students’ perceived peer relations and externalizing problems. Our findings raise a number of key questions for future research about potential mediating mechanisms that could explain associations

between discipline disproportionality and racial disparities in peer connectedness, prosocial affiliation, and externalizing problems. The findings also suggest a critical need to invest in training, supports, and resources for schools to mitigate the damaging effects of school inequities and to ultimately eradicate the discipline gap.

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Table 5.1.
Student and School Characteristics

Student characteristics (<i>N</i> = 15,884 Students)	N (%)
Race/Ethnicity	
Black	5831 (36.7)
White	10,053 (63.3)
Maternal education	
Did not graduate from high school	1,427 (9.0)
Graduated from high school	4,719 (29.7)
Attended some college	3,345 (21.1)
Graduated from college	6,393 (40.3)
Age ^a	15.88 (1.27)
Gender	
Male	7,935 (50.0)
Female	7,949 (50.0)
School characteristics (<i>N</i> = 47 Schools)	M (SD)
School size (M)	1, 276.7 (480.1)
Under-qualified teachers (%)	34.8 (10.7)
Free and reduced price meals (%)	39.8 (17.1)
Racial composition (% Black)	32.7 (20.2)
Suspension rate (%)	19.3 (12.0)
Students with ≥ 1 out-of-school suspensions (M)	271.6 (180.3)
Suspension risk ratio (Black v. White students)	2.48 (1.2)

^a Age represents mean with standard deviation in parentheses.

Table 5.2.

Racial disparities in peer relations and externalizing problems by racially disproportionate disciplinary context

	Peer Connectedness				Prosocial Friendships				Externalizing Problems			
	γ	SE	t	ratio	γ	SE	t	ratio	γ	SE	t	ratio
Student-level variables												
Black race	-.038 ***	<.001	.008	-4.57	-.016	.185	.012	-1.35	.093 ***	<.001	.009	10.38
Racial belonging	.104 ***	<.001	.007	15.64	.127 ***	<.001	.009	13.55	-.002	.817	.011	-0.23
Maternal education	.024 **	.003	.008	3.00	.117 ***	<.001	.012	10.14	-.148 ***	<.001	.010	-14.46
Age	-.041 ***	<.001	.008	-4.80	.048 ***	<.001	.010	5.05	-.038 ***	<.001	.009	-4.31
Male	.134 ***	<.001	.008	17.82	-.155 ***	<.001	.009	-16.62	-.008	.364	.009	-0.92
Perceived school equity	.460 ***	<.001	.010	44.77	.267 ***	<.001	.011	23.63	-.214 ***	<.001	.011	-20.04
School-level variables												
Study group	.012	.530	.019	0.63	-.023	.090	.013	-1.74	.037 **	.008	.013	2.79
School size	-.019	.425	.023	-0.81	.020	.074	.011	1.84	-.004	.799	.016	-0.26
Concentrated disadvantage	-.141 ***	<.001	.020	-7.04	-.036 *	.013	.014	-2.61	.081 ***	<.001	.015	5.38
Disproportionate risk ratio	.004	.825	.018	0.22	.021	.096	.013	1.70	-.012	.313	.012	-1.02
Cross-level interaction												
Black race x discipline disproportionality	-.021 *	.015	.008	-2.43	-.024 *	.042	.012	-2.10	.032 ***	.001	.010	3.26
Proportion of between-school variance explained		54.99%				44.09%				27.66%		
AIC		39353.03				42133.72				43473.206		

Note. Coefficients are standardized. $N=15,876$ students, $J=47$ schools. Unadjusted ICC, Peer Connectedness = .04; Prosocial Peers = .01; Externalizing Problems = .01. The adjusted models' -LL all significantly differed from the null model -LL at the <.001 level. *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$.

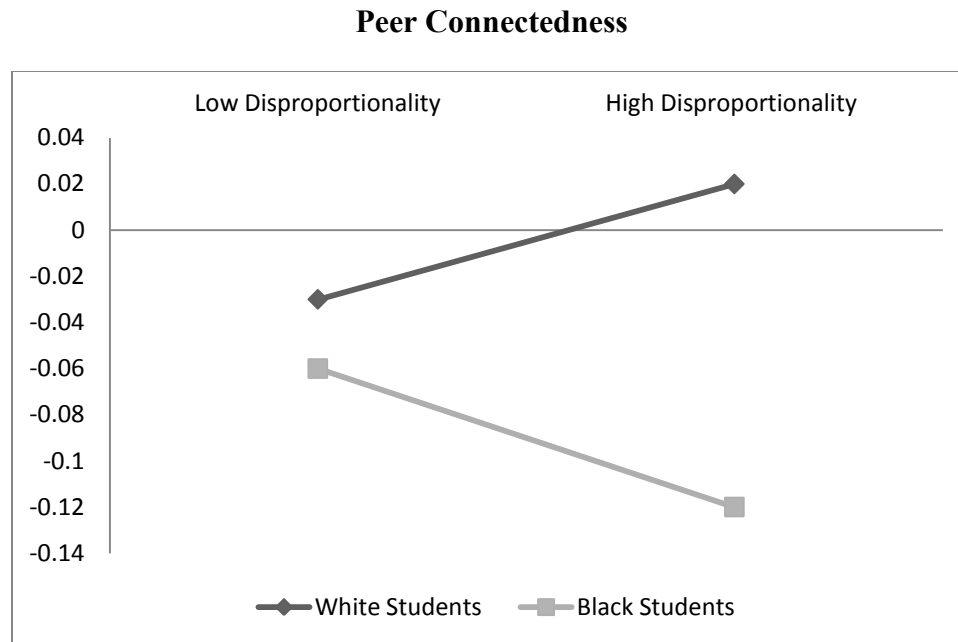


Figure 5.1. Racial disparities in students' perceived connectedness to peers at school by racially disproportionate disciplinary context. All axes reflect standardized coefficients and outcomes. Low disproportionality is the average of the lower quartile; high disproportionality is the average of the upper quartile.

Prosocial Friendships

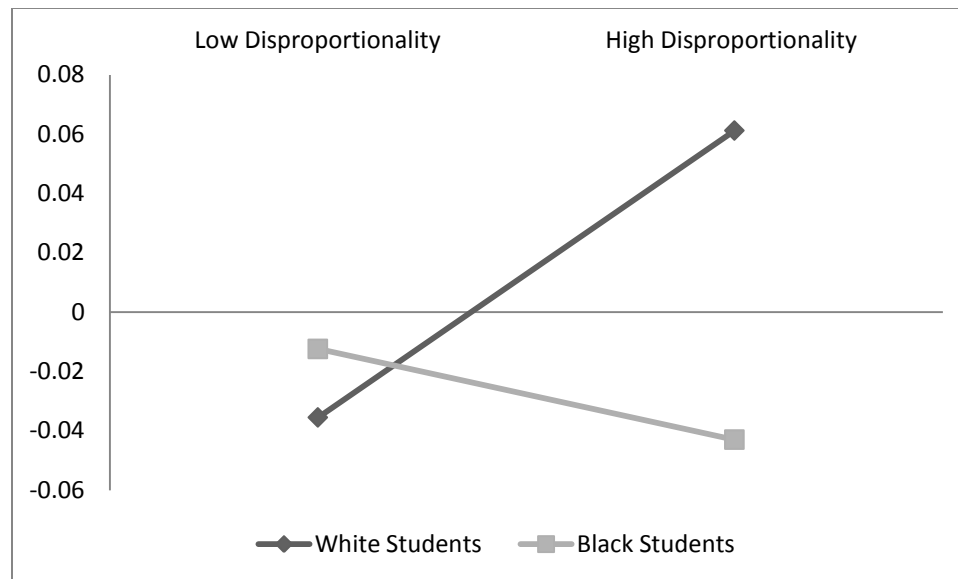


Figure 5.2. Racial disparities in students' affiliation with prosocial peers by racially disproportionate disciplinary context. All axes reflect standardized coefficients and outcomes. Low disproportionality is the average of the lower quartile; high disproportionality is the average of the upper quartile.

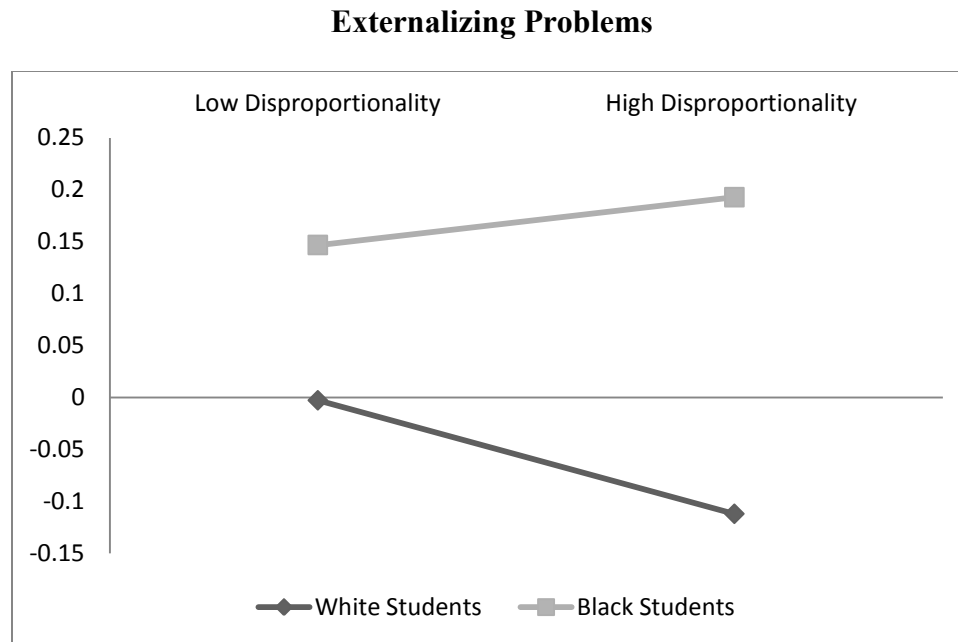


Figure 5.3. Racial disparities in students externalizing problems by racially disproportionate disciplinary context. All axes reflect standardized coefficients and outcomes. Low disproportionality is the average of the lower quartile; high disproportionality is the average of the upper quartile.

Chapter 6

Conclusions, Public Health Implications, and Future Research Directions

Chapter 6

Conclusions, Public Health Implications, and Future Research Directions

Overview

The purpose of this thesis was to explore students' experiences of equitable and supportive school climate, utilizing data from multiple informants and sources. Aim 1 employed structural equations modeling to identify a theoretical model of inequitable school support and related engagement and social-emotional outcomes among Black and White high school students. Aim 2 investigated staff-reported school organizational health as a contextual moderator of racial disparities in Black and White students' experience of equitable and supportive school climate utilizing hierarchical linear modeling. Aim 3 proposed guidelines and presented a research case study on the measurement and modeling of discipline disproportionality within a theory-driven, school climate-oriented conceptual framework. Aim 4 examined the interaction of disproportionate disciplinary contexts with racial disparities in Black and White students' perceived social and emotional wellbeing using multilevel methods.

Summary of Results

Aim 1. Aim 1 used structural equations modeling to examine racial differences in students' experience of school support, psychological needs fulfillment, and student functioning. Participants were 22,057 students in 58 Maryland high schools. Black youth reported lower ratings of caring relationships, equitable treatment, school belonging, and engagement, while reporting higher levels of externalizing problems. Structural equations modeling coupled with tests of mediation found that Black students' differential experience of equity and caring at school explained their lower ratings of school belonging. A second structural equations model, coupled with tests of

moderation, found that belonging, in turn, was significantly more salient to Black youth's emotional engagement and externalizing problems relative to these associations among White youth, suggesting a pathway by which behavioral disparities may emerge.

Aim 2. Aim 2 examined inequalities in Black and White students' experiences of school climate and explored whether indicators of school organizational health and staff burnout moderated differences in students' school experiences by race. Utilizing hierarchical linear modeling with a sample of 18,397 Black and White students and 2,391 school staff in 53 schools, we found a consistent pattern of racial inequalities across three indicators of school climate (caring, equity, and engagement), such that Black students reported less positive experiences of school climate than White students. In addition, we found significant, positive associations between aggregated staff-report of school organizational health and student-reported school climate. Surprisingly, school organizational health was more strongly associated with positive perceptions of school climate among White students than Black students, translating into greater racial disparities in perceived school climate at schools with greater organizational health. We also found a trend of negative associations between staff-reported burnout and students' experience of school climate, such that the racial gap was smaller in schools with high ratings of burnout. These findings indicate that although school organizational health may be a *necessary* focus in improving students' experience of equitable and supportive school climate, it is not *sufficient* to close the gaps.

Aim 3. Aim 3 translated federal guidelines for special education disproportionality measurement and synthesized methods utilized the empirical literature for a research audience focused on discipline disparities within school settings. A

conceptual framework was developed based on a review of the literature and applications were proposed to guide future research on the causes and consequences of school discipline disproportionality. A case example of research illustrating the proposed methods and conceptual framework showed that disproportionate disciplinary contexts were significantly, inversely associated with students' perceptions of equitable treatment in a large, statewide sample of Black and White high school students.

Aim 4. Employing hierarchical linear modeling, Aim 4 characterized 47 high schools by their degree of discipline disparity utilizing a measure of relative risk of out-of-school suspension among Black compared to White students. We then explored whether setting-level discipline disproportionality interacted with racial gaps in student-reported peer connectedness, prosocial friendship formation, and emotional adjustment (externalizing problems). We found that disproportionate disciplinary contexts were associated with wider racial disparities in students' social and emotional wellbeing, suggesting a number of potential avenues for future research.

Limitations and Strengths of the Thesis

One of the most salient attributes of the MDS3 initiative is its utilization of multiple informant reports of school climate, including student, school staff, parent, and independent observers' report. Parent report of engagement is of great interest, particularly when assessing equitable and culturally responsive and sustaining school practices (in which quality of the school-family relationship is theorized to play an important role; Amatea, Cholewa, & Mixon, 2012). We chose not to include this source of data, however, due to concerns regarding selection bias based on the voluntary nature of participation in the parent survey and low response ratio of parent to student survey

participation. We did not use classroom observations of teacher and student practices either because given the nature of our research questions; the observational measures did not track differences in student-teacher interactions by race or ethnicity. However, we were able to utilize both student and staff reported data, as well as school-level data from multiple sources (i.e., the Maryland State Department of Education and the U.S. Department of Education's Office of Civil Rights) in Aims 2, 3, and 4. Nonetheless, an important limitation is that one study of this thesis (Aim 1) solely relied on student report.

There are a few concerns regarding our reliance on student report in Aim 1. One is the possibility that student ratings are more reflective of unique attributes of that student than of the climate experienced in their school. However, research examining this hypothesis found that average student-reported school climate within each school predicted a statistically significant amount of the between-school variation in student academic and cognitive outcomes, while differences between student raters within each school were *not* significantly associated with student outcomes (Van Horn, 2003). This finding provides support for the validity of student report of their experience of school climate. In addition, because the focus of the present research was on racial differences in students' subjective perceptions and experiences of climate, concerns regarding the validity of student ratings of objective school climate are less of an issue in this thesis. Another concern regarding reliance on student report in Aim 1 is that the student is the informant on both predictors and outcomes (i.e., on the school *and* their own characteristics, behaviors, and performance) with no other source to validate their report. In the context of examining behavior of children and adolescents, it has become the gold standard to collect information from multiple informants (Renk, 2005). Unfortunately,

the use of anonymous data in this research precluded the opportunity to match student and teacher measures of student behaviors. It is possible that students may exaggerate or understate their academic and behavioral outcomes due to unobserved biases. For example, variation in parent and peer expectations may influence whether academic and behavioral outcomes that are viewed as desirable from a school or research perspective are in fact viewed as desirable from a student perspective (Day-Vines & Day-Hairston, 2005). Therefore, these outcome measures may be subject to social desirability bias in either direction, which may vary as a function of student factors. The anonymous, web-based data collection protocol utilized by the MDS3 initiative may serve to offset this concern somewhat. Specifically, research documents the enhanced validity and reliability of web-based surveys relative to print forms (Boyer et al., 2002; Pitkow & Recker, 1995; Stanton, 1998). Furthermore, research shows that social desirability bias in particular is minimized when study participants are allowed to fill out confidential and sensitive information online (Tourangeau et al., 2003). Therefore, online data collection may have served to attenuate any social desirability bias and increase validity in these studies.

Other limitations include the cross-sectional nature of the data, which precluded the step-wise mediational analyses necessary to facilitate causal inferences (such analyses typically require data from at least two time points; Cole & Maxwell, 2003). As a result, this thesis did not clarify *causal* relationships theorized in the overarching conceptual framework. Although multiple years of survey data are collected in MDS3, anonymous data collection again made linkage of observations by participant over multiple time points impossible. However, inferences from the thesis findings can inform

the design of future studies that would allow more robust tests of mediation. Another limitation is that much is unknown about the effect of severely unequal group sizes on results obtained from a multiple group SEM analyses, except that larger groups wield more influence on the results than smaller groups. However, some researchers contend that unequal sample sizes in multi-group SEM analyses is not concerning if the sample group sizes correspond to the proportion of individuals' group membership in the population from which the sample was drawn (University of Texas at Austin, 2012), which is largely the case in the adolescent survey data in the MDS3 project.

Despite these limitations, the use of rigorous methods such as multilevel and latent variable modeling made possible the assessment of associations between key constructs related to inequitable school climate and racial differences in students' school experiences. Another strength of the proposed research is the large sample size of students, ranging from nearly 16,000 to 22,000 depending on the study, which represented most of each school's student population. This approach both reduces sampling error and increases power in using SEM modeling. Similarly, another advantage of the MDS3 dataset are the large number of schools and school districts across state of Maryland involved, and availability of sample weights, which enhances generalizability by reducing sampling error and selection bias at the school and district level. A strength of the MDS3 adolescent survey data, in addition to the large number of schools, is the rich, myriad questions related to school climate and student engagement, which allowed exploration of theoretically distinct constructs within an ecologically-oriented framework that discerned individual versus contextual facilitators and indicators of student engagement. This thesis focused on differences in students' perceptions of the

school in an attempt to situate their engagement and social emotional outcomes in ecological context. As such, a strength this thesis is that it framed interactions with schools and school staff as the subject of study, with students as the informants.

Public Health Implications

This thesis research supports the likelihood that inequity within the school climate (i.e., discipline practices that disproportionately affect Black youth, perceived unequal treatment and cultural exclusion of historically marginalized groups, inequalities in experience of caring relationships) partially explains disparities in students' academic, social, emotional, and behavioral outcomes at school. Our findings point to the importance of enhancing Black youth's perceptions of equitable and caring relationships with school staff and reducing disproportionate discipline practices in order to promote engagement and prosocial outcomes among Black youth at school. Across several studies, this thesis found strong links between perceived equity and a number of indicators of healthy development and prosocial outcomes, in alignment with prior research on school equity indicating that perceived equitable climate may be an important mediating mechanism in students' positive developmental outcomes (Debnam, Lindstrom Johnson, Waasdorp, Bradshaw, in press).

In Aim 2, we learned that staff-reported school organizational health was not sufficient to support equitable experiences of positive school climate between Black and White youth. This suggests that an explicit focus on equity as a dimension of school organizational health may be a necessary next step in efforts to promote students' equitable school experiences and reduce disparities in student outcomes. In Aim3, we found that students perceived less equitable school climates in schools characterized by a

higher degree of concentrated disadvantage (high suspension rates, percentages of under-qualified teachers, percentage of low SES and Black students enrolled). These findings point to policy and programmatic efforts to reduce discipline rates overall and to the need to invest resources in teacher professional development, training, and advanced education in under-resourced schools.

Because our findings from Aim 3 and 4 suggest the possibility that inequitable school discipline practices are perceived by students as discriminatory or inequitable treatment of Black youth, the public mental health implications of discipline disproportionality are more apparent. Specifically, our findings from Aim 4 are consistent with the extensive literature on the mental health consequences of experiences of discrimination in adolescence, including externalizing and internalizing symptoms (Brody et al., 2006; Seaton, Caldwell, Sellers & Jackson, 2010; Bogart et al., 2013). Therefore, school-based mental health services may need to provide greater support and resources for prosocial, healthy coping strategies among Black students in schools identified with high levels of racial discipline disproportionality.

School-based intervention. Public health intervention in schools is critical to address the root causes of inequitable social, emotional, and behavioral health outcomes among Black youth in U.S. schools. Within the public health preventive intervention and mental promotion framework (Mrazek & Haggerty, 1994; O’Connell, Boat, & Warner, 2009), universal, selective, and indicated interventions are typically delivered through a nested approach, not unlike educational models such as response to intervention (RTI) and positive behavioral supports (PBS). Within this three-tiered public health model, universal (primary) interventions to address racial and ethnic disparities in student

outcomes should target school climate and staff skills and practices, whereas selective (secondary) interventions may focus on promoting student social and emotional skills and coping strategies. Last, indicated (tertiary) preventive interventions may be targeted to prevent recurrence of more severe behavioral problems or disciplinary infractions.

Below we consider school-based interventions across the spectrum of prevention.

Culturally responsive and sustaining school climates. Students' experiences of equitable and supportive school climate are an important point of intervention for school administrators, teachers, and school counseling staff to cultivate. One potential avenue for change is School-Wide Positive Behavioral Interventions and Supports (SWPBIS). SWPBIS includes a universal level of intervention designed to promote a unified, positive school culture through proactive teaching about appropriate behaviors and consistently implemented consequences for infractions (Sugai et al., 2000). Despite its demonstrated success in improving school climate and reducing office disciplinary referral rates (Bradshaw, Koth, Thornton, & Leaf, 2009; Horner et al., 2009), a number of studies document that disciplinary inequity and higher rates of disciplinary sanctions remain among Black, Latino, and American Indian students in schools implementing SWPBIS (Bradshaw et al., 2010; Kaufman et al., 2010; Vincent, Randall, Cartledge, Tobin, & Swain-Bradway, 2011; Vincent et al., 2012; Vincent et al., 2013). As a result, researchers have begun to explore strategies to expand core features of SWPBIS to facilitate culturally responsive and sustaining behavior supports (Sugai, O'Keefe, & Fallon, 2012; Fallon, O'Keefe, & Sugai, 2012; Vincent et al., 2011). Specifically, recommendations have included systematic approaches to enhancing school staff's cultural knowledge and self-awareness; commitment to culturally sustaining student

supports; and culturally-valid decision-making to enhance equitable disciplinary and other student outcomes (Vincent et al., 2011).

Some early research suggests the promise of professional development and coaching interventions for teachers to support their skills in equitable and culturally sustaining practices (Gregory, Allen, Mikami, Hafen, & Pianta, 2014; Bradshaw et al., manuscript in preparation). These efforts have principally focused on student-teacher classroom interactions and relationship building, based upon research highlighting the importance of highly structured academic and behavioral expectations *and* highly warm, caring and supportive interactions with students (i.e., warm demander or authoritative styles; Gregory, Cornell, & Fan, 2011; Gregory & Weinstein, 2008; McNeely, Nonnemaker, & Blum, 2002). The warm demander approach is consistent with multicultural educational literature suggesting that school practices and student-teacher relationships characterized by a warm, demanding style (caring combined with high expectations) may be more culturally responsive and culturally sustaining for Black students (Gay, 2002; Ladson-Billings, 1995).

Social-emotional learning (SEL) and coping interventions. SEL integrates competence-promotion and youth-development frameworks to address contextual and individual risk and protective mechanisms that may contribute to academic, emotional, or behavioral challenges at school. As such, SEL oriented interventions are well-suited to the prevention of racial and ethnic disparities in student outcomes. SEL interventions typically teach both adults and students skills to understand and manage emotions, set and achieve positive goals, feel and show empathy for others, establish and maintain positive relationships, and make responsible decisions (Bear, 2010; CASEL, 2003;

Greenberg et al., 2003; Guerra & Bradshaw, 2008; Hawkins, Smith, & Catalano, 2004; Zins, Payton, Weissberg, & O'Brien, 2007). The capacity to coordinate these competencies when dealing with daily situations and challenges provides a foundation for better adjustment and school performance as reflected in more positive social behaviors, fewer conduct problems, less emotional distress, and improved grades and academic test scores (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). SEL interventions can employ a range of strategies. For example, one SEL intervention, Coping Power, provides training in social skills and social problem-solving to address aggressive and disruptive behavior problems (Lochman & Wells, 2004). To address psychological and neurocognitive damage resulting from chronic stress exposure among urban youth, another promising SEL intervention promotes healthy coping strategies through school-based mindfulness and yoga practices (Mendelson et al., 2010).

Restorative justice and restorative practices. In public mental health terms, restorative justice can be considered an indicated intervention with the purpose of preventing reoccurrence of delinquent behavior. Restorative practices, on the other hand, could fall within either universal or selective prevention approaches to reduce disciplinary disproportionality. These approaches collectively range from restorative circles and conferences (McCold, 2003), to family group conferencing (American Humane Association, 2003), to relationship-building and prosocial development activities in education settings (Riestenberg, 2002) and are increasingly being integrated in school settings in order to reduce reliance on suspension. Although restorative practices in schools are a relatively new approach to addressing problems related to student misconduct and related behavioral concerns, some forthcoming research shows that they

have promise to improve teacher-student relationships and promote greater racial equity in school discipline outcomes (Gregory, Clawson, Davis, & Gerewitz, in press).

Implications for Theory and Future Research

This thesis builds upon the extant literature on school climate, student engagement, and school disparities primarily by identifying linkages between these largely separate lines of research. Specifically, student engagement research has only recently begun to attend to contextual influences on engagement (Fredricks et al., 2004; Skinner & Pitzer, 2012), and may benefit from greater integration with the extensive work that has been done to measure and understand school climate and its association with student academic, behavioral, and social-emotional outcomes. Similarly, school climate literature is only beginning to attend to racial differences in students' perceptions of climate and school equity. This emerging focus on inequitable school climate (Ross, 2013) and school racial climate (Benner & Graham, 2013; Byrd & Chavous, 2011; Mattison & Aber, 2007; Shirley & Cornell, 2012) represents a critical research agenda in our broader efforts to identify and ultimately eliminate disparities in school settings.

As this research is only emerging, little is known about the antecedents of inequitable school climate – including how school organizational health and staff wellness may influence students' equitable and supportive experiences as school. Extensive research on the discipline gap has documented the disproportionate exposure to exclusionary school punishment among Black youth (Skiba et al., 2011), the validity of claims that these disparities are caused by school and school staff cultural and racial biases (Bradshaw et al., 2010; Wallace et al., 2008), and the harmful consequences of punitive removal from school and classroom learning opportunities (Fabelo et al., 2011).

Yet, our understanding of the consequences of inequitable school disciplinary practices on positive school climate has been constrained by measurement and modeling challenges.

Future studies examining the antecedents and consequences of inequity in students' experiences of supportive climate and disciplinary sanctions are likely to continue to face constraints regarding the measurement and modeling of inequity and disparity as predictors and outcomes. Specifically, more dialogue and development of consensus in the measurement of discipline disproportionality within multivariate analyses is needed to identify malleable school and school staff factors that show promise in reducing discipline disparities – and not just overall rates of disciplinary actions. As we continue to explore intersections between race/ethnicity, sex, and sexual and gender identity and expression as it relates to school inequity, it may become more essential to have clearly established measurement and theoretical approaches for use in exploring research questions with more advanced statistical methods (i.e., multivariate, multilevel, and structural equations models).

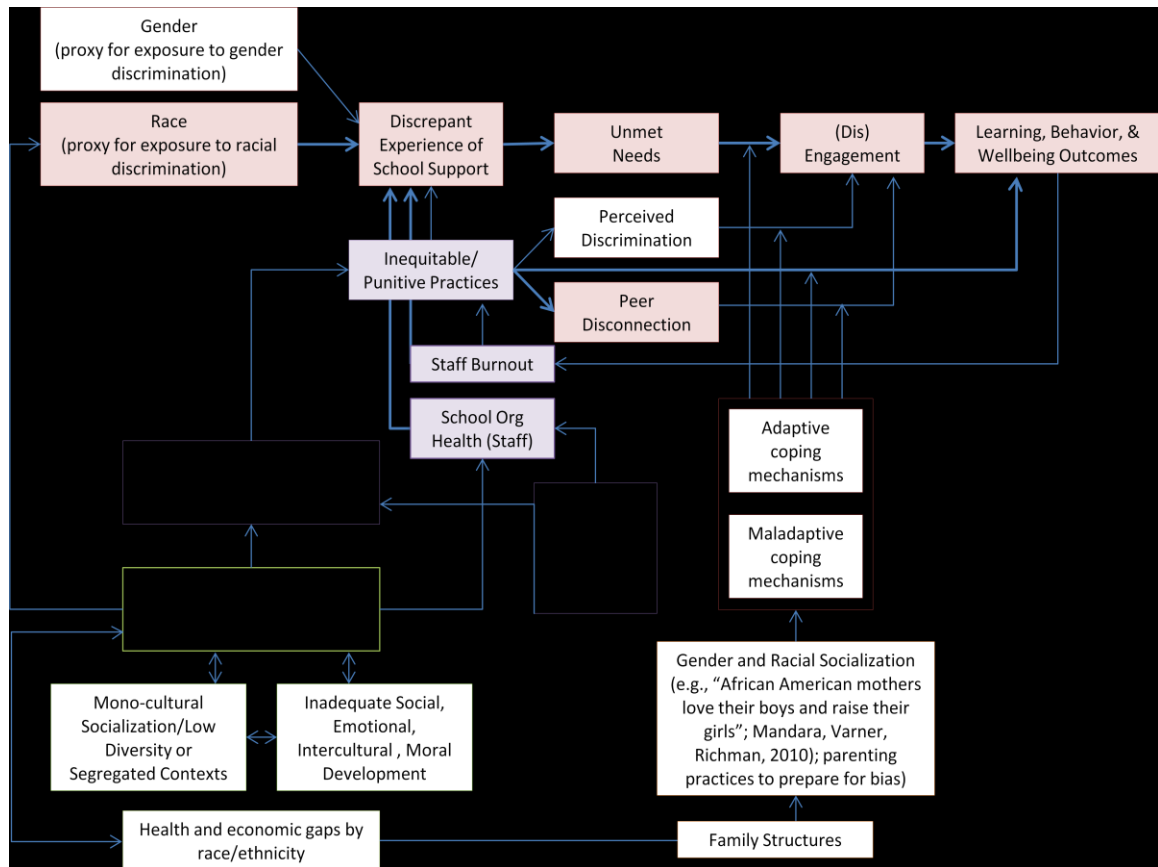
The findings from this thesis also suggest there may be two ways of assessing inequitable school climate: first, either by directly asking students, staff, and parents as informants on schools' climate of equity; or second, by assessing differences in perceptions of subjective dimensions of school climate (e.g., caring relationships with staff and peers) between student groups. Both school climate and student engagement focused research will benefit by establishing clearer definitions and measures of engagement-related processes that reflect differences in individual versus contextual factors (Fredricks et al., 2004), as well as distinctions between theorized facilitators,

indicators, and outcomes of processes that motivate engagement (Skinner & Pizter, 2012).

A modified version of the conceptual framework on cultural and ecological discontinuity presented in Chapter 1 of this thesis is presented below, in Figure 6.1., with the concepts and pathways explicitly examined in this thesis research highlighted.

Returning to this framework illustrates areas addressed and foci for further research attention. One the most prominent gaps, which we have previously noted, is research on the role of perceived discrimination as a potential mediator in the association between school inequitable discipline practices and disparate outcomes.

Figure 6.1. Modified Conceptual Framework for Thesis Research



As the youth population of the U.S. becomes more and more diverse, and as we learn

strategies to promote greater equity and equality for historically marginalized students (Cole, 2000; Odom et al., 2005), a fundamental shift in research approaches is likely to move the field beyond conducting research *on* cultural minorities to a more complex understanding of research as ‘culturally situated practice’ (Arzubiaga, Artiles, King, Harris-Murri, 2008). The problem with research on cultural minority groups is in part that “with rare exceptions . . . these populations are treated, in one way or another, as problems” (Cole, 2000, p. 374). Arzubiaga and colleagues further argue that the broader theoretical problem with research *on* cultural minority groups is that it focuses on historically marginalized groups in research studies under the erroneous assumption that culture is a factor only in reference to particular groups. Research in this field will advance with the realization that our outcomes of interest are intrinsically cultural.

Conclusion

Understanding the role of students’ inequitable school experiences is an essential line of research to inform our broader efforts to eradicate racial disparities in academic, disciplinary, and mental and behavioral health outcomes. Taken together, the findings of the four studies of this thesis suggest that racial and cultural divides may undermine students’ experience of supportive school climate, consequent engagement, and psychological adjustment in schools. This thesis research suggests a critical need to invest in training, supports, and resources for schools to mitigate the damaging effects of school inequities and to eradicate the discipline gap. An explicit focus on school equity, cultural responsiveness and inclusion, and culturally sustaining school practices is likely key to reform efforts to more equitably support all students’ engagement and success in school.

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APPENDICES

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Appendix A: Methodological Discussion and Preliminary Analyses

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Appendix A

Methodological Discussion and Preliminary Analyses

On Latent Variable Modeling

EFA. Factor analyses comprise both exploratory (theory development) and confirmatory (theory testing) modeling techniques. In exploratory factor analysis (EFA), a researcher first uses data to determine the number of factors represented by the data and then uses maximum likelihood estimation to obtain the observed correlation matrix (DeVellis, 2003). The starting point of EFA is to assess the correlation matrix (Field, 2000). Assessing the pattern of correlations between the items may reveal the items are likely influenced by the same construct. Items that are highly uncorrelated are most likely influenced by different constructs. As part of the EFA, principal components analysis (PCA) assessing the eigenvalues (of the correlation matrix, greater than 1.0) is conducted to identify the number of factors to retain (DeVellis, 2003). An eigenvalue represents the amount of information captured by a factor, and therefore a factor with an eigenvalue inferior to 1.0 contains less information than the average item. A scree plot was utilized to help visualize the eigenvalues associated with the items within the scale. Catell's criterion suggests retaining the factors that are located above the elbow of the plot (DeVellis, 2003). To extract the factor loadings, a maximum likelihood extraction was used.

CFA. In confirmatory factor analysis (CFA), a priori theory (perhaps developed through EFA techniques in another data set) dictates assumptions about directionality of factor influences, number of factors, and number of indicators (Brown, 2006). CFA therefore provides a method for a researcher to test whether a model fits an observed set

of data (DeCoster, 1998). Its purpose is generally to test a hypothesis of measurement invariance, which if true supports the construct validity of the theorized factor.

Researchers caution against the misleading use of the term ‘confirmatory’, as these analytic methods alone cannot confirm or prove a model is correct; rather, confirmatory analyses are appropriately utilized for the purposes of falsifying a theory (Bollen and Long, 1993).

SEM. Subsequent to factor analyses to develop the measurement component of the model, a structural component was added using structural equation modeling (SEM) methods. SEM refers to a family of statistical techniques that estimate causal associations using a combination of observed data and theoretical assumptions (Bollen, 1989; Kline, 2011). The strength of SEM is its most salient feature – the ability to construct latent variables. Latent variables, in contrast to manifest variables, are not directly measured, but are estimated based on several observed variables hypothesized to represent an underlying latent variable. SEM is therefore a highly attractive analytical approach as it simultaneously executes multiple analyses, including factor analysis, correlations, and regressions within a single model (DiLalla, 2008). This allows the researcher to capture unreliability in the measurement model, which then theoretically permits the structural coefficients between latent variables to be more precisely estimated. This capability to simultaneously model measurement components (factor loadings, correlation coefficients) and structural components (i.e., regression path coefficients) maximizes model fit, which in turn theoretically allows SEM to better account for measurement error than standard regression techniques (Bollen, 1989).

There are three major steps to follow when including a structural component (i.e., regressing endogenous variables on exogenous variables): model specification (identifiability), model estimation (estimability), and assessment of model fit. The appropriateness of the model is determined by its identifiability and its estimability. Identifiability is ascertained by whether there are enough parameters to provide a unique interpretation of the model, and it can be improved by minimizing the number of parameters. To ensure the model will be identifiable, researchers must either fix the factor's variance or one of the loadings associated with a given factor (Gillapsy, 1996). Estimability relates to whether there is enough data to estimate the parameters. Parameter estimation is conducted by a comparison of actual and estimated covariance matrices to identify the best fitting model. Maximum likelihood estimation selects values of model parameters that generate a distribution that gives the observed data the greatest probability, however other methods can be used including weighted least squares or asymptotically distribution-free methods (e.g., Bayesian techniques).

The degree of model fit is gauged by goodness-of-fit criteria, including the Satorra-Bentler scaled statistic [S-B χ^2], comparative fit index [CFI; Bentler, 1990], non-normed fit index [NNFI, also known as the Tucker-Lewis Index (TLI); Bentler & Bonett, 1980], the root-mean-square error of approximation (RMSEA) with 90% confidence interval [RMSEA; Steiger & Lind, 1980], and the standardized root mean square residual (SRMR; Hu & Bentler, 1999). A good model fit was determined by chi-square test insignificance $>.05$, CFI $> .95$, NNFI (TLI) $> .95$, and RMSEA $< .05$. For RMSEA, MacCallum, Browne and Sugawara (1996) suggest that 0.01, 0.05, and 0.08 cutpoints be used to indicate excellent, good, and mediocre fit respectively. For SRMR, a value less

than .08 is considered a good fit (Hu & Bentler, 1999). With large sample sizes, as is the case with the proposed data set, the chi-square test is known to be sensitive (Bollen, 1986, 1990; Marsh et al., 1988). To test whether the poor fit is actually due to the sensitivity of chi-square, parameters can be freed until a well-fitting model according to chi-square is obtained. Then, the parameter estimates can be compared from this analysis to the one with fewer parameters. If the original parameter estimates are reproduced in the less parsimonious model, then it may be argued that the chi-square test is sensitive to the large sample size. In addition, in recognition of the problem that large sample size can lead to rejection of inconsequentially poor-fitting models, alternative fit indices based on principals of parsimony (i.e., RMSEA) are increasingly referenced to make decisions regarding competing models (Browne & Cudeck, 1993). Because of the particularly large sample size in this study, referring to alternative fit indices was the approach taken in this study.

Statistical Assumptions of Structural Equations Modeling

Kline (2012) underscores the critical importance of correct model specification and states that sensitivity to statistical assumptions may be of even greater consequence in SEM than in other statistical methods. If a model is incorrectly specified, error propagation can occur during parameter estimation using full-information maximum likelihood estimation techniques.

Independence. One of the central assumptions of maximum likelihood (ML) estimation is that of independent scores. In school-based research, in which students are nested within classrooms, schools, and school districts, non-independence of scores is a particular concern. Specifically, individuals in school-based research can be seen as

level-1 units of study arranged in clusters (e.g., classrooms, schools), considered level-2 units, which have qualities that influence the study. As such, there is variability associated with each level of the hierarchically organized data which creates correlations within level-2 units. This correlation is typically quantified as the intraclass correlation coefficient (ICC), which is a statistic that indicates how strongly units in the same cluster resemble one another. To account for the dependency between observations (students) within clusters (schools), we conducted analyses using the complex analysis feature in Mplus (Version 7.11, Muthén & Muthén, 1998-2012). This utilizes maximum likelihood estimation with robust standard errors (MLR; Muthén & Muthén, 1998-2012), which accounts for the nested structure of the data by adjusting the standard errors of the estimated coefficients.

Normality. A second assumption of ML estimation is a multivariate normal joint distribution of endogenous variables (i.e., endogenous variables are continuous; Kline, 2012). Given the ordinal nature of the data, normality was assessed. Guidelines provided by West, Finch, & Curran (1995) were followed, which recommend concern if skewness > 2 and kurtosis > 7 . Composite variables were created in Stata 11 for each of the hypothesized latent variables to assess normality. Eight of nine composite variables met West and colleagues' criteria for normality (all except *Competence*; Skewness=-2.08892, Kurtosis = 8.714286). Single item indicators of *Truancy* (Skewness=2.51, Kurtosis = 8.48) and *Physical Fights* (Skewness=4.08, Kurtosis = 19.27) were also non-normal. In Mplus, maximum likelihood estimation with robust standard errors (MLR) is robust to non-normal data (Muthén & Asparouhov, 2002). However, non-normal latent variables could also be transformed to achieve approximate normality using weighted

least squares estimation. Non-normal data in Mplus could also be handled with maximum-likelihood estimation using numerical integration (quadrature; Rabe-Hesketh, Skrondal, and Pickles, 2005), however in Mplus this was not possible with the Model Indirect and Grouping features used in Hypotheses 2-3.

Measurement error. A third assumption of ML estimation is no measurement error of the exogenous variables (Kline, 2012). The exogenous variables in each aim represent demographic or study data (e.g., race/ethnicity, intervention status) which minimizes the likelihood of measurement error.

Missingness. A fourth assumption of ML estimation is no missing data (Kline, 2012). Preliminary analyses were conducted to explore patterns of missingness in the data. An examination of the patterns of missing data indicated missingness by race/ethnicity, age, and gender, however there was limited evidence that the level of missingness was problematic. The differences were small and unlikely to have practical significance. As a result, the analyses assumed data was missing at random (MAR). MAR assumes the reason for missingness is unrelated to the missing value itself, or is judged to be random after adjusting for observed covariates (Arbuckle & Wothke, 1999). Mplus software adjusts for missingness using full-information maximum-likelihood (FIML) estimation, which is widely recognized as an appropriate means of handling missing data assumed to be MAR (Raudenbush & Bryk, 2002; Shafer & Graham, 2002).

Other Statistical Concerns Pertinent to the Analysis of the Available Data

Sample weighting. Sample weights were utilized in the analysis for Aim 1, Hypothesis 1, which examined mean differences, but not for the structural models in Aim 1, Hypotheses 2-3. The weighted sample allows for generalizability of the sample to the

full population of students within the 58 schools. Sample weights were created using the raking method (Battaglia, Izrea, Hoaglin, & Frankel, 2013), an iterative procedure that produces weights based on marginal results from multiple variables in Stata 11.0. The three school-specific variables of interest were the total number students at each grade level (9-12th grade), of each sex, and of each race/ethnicity (White, Black, Latino/Hispanic, Asian American, and Other). Weights that adjusted the subsample of participants from each school to the first school-specific characteristic were calculated using one variable at a time. The weights were further adjusted to match the school population using the next variable of interest. Once all of the variables were used, the sequence was repeated until the weights converged. This iterative procedure was repeated for each school (Battaglia et al., 2013).

Intervention condition. Given the group randomized controlled design of the MDS3 project, intervention condition of the school was a consideration that must be addressed in all analyses. One ideal method of addressing this issue for purposes of the cross-sectional analyses would be to assess only baseline survey data. However, because of the timing of baseline survey data collection across cohorts, and availability of newly added variables in subsequent administrations, this was not possible. Two other options for handling potential differences in intervention condition groups were to 1) limit analyses to the comparison condition or to 2) include the intervention condition in the model as covariate to control. Ultimately, intervention condition was included as a covariate to control in this study to avoid a drastic reduction in sample size, which would have limited power. Preliminary analyses were conducted in Stata to examine differences between intervention and comparison schools on several outcomes and found

no differences. For example, linear regression on the outcome variables for Manuscript 4 with clustering on school and robust standard errors indicated no significant differences between intervention and comparison schools on Culture of Culture of Equity ($p=.996$), Student Connectedness ($p=.942$), Prosocial Relationships ($p=.184$), and Externalizing Problems ($p=.110$).

Causality. As a priori theory sets hypotheses about directionality are not directly tested with cross-sectional data, competing models must be evaluated and considered in light of current theory and prior empirical findings (DiLalla, 2000). Even then, causal inferences or conclusions about the veracity of a causal hypothesis, particularly when analyzing transactional processes, are rarely justified when using cross-sectional data. Bradford-Hill criteria for causation (i.e., the strength of association, consistency of the finding, specificity, temporal relationship, dose-response relationship, plausibility, coherence with other findings, experimentation, and consideration of alternative theories) provide a useful point of reference for careful consideration the importance of examining repeated measures (longitudinal data) in making causal inferences.

Measurement of Key Constructs in Aim 1

Preliminary analyses to assess construct validity (including factor structure and internal consistency reliability) of two primary hypothesized constructs in Aim 1 were conducted – the *school support* construct and the *psychological needs* construct.

Experience of School Support. Survey items were given on a four-point Likert scale and were adapted from the California Healthy Kids Survey (2010; Hanson & Kim, 2007) and the School Development School Climate Survey (Haynes et al., 2001). An EFA of twelve school support items was completed utilizing baseline data from Cohort 1

Wave 1 (Spring 2011 administration; $N=17,960$, $J=52$ schools). With ordinal data, the factor structure of a polychoric matrix rather than Pearson covariance matrix is often analyzed (Koh & Zumbo, 2008). However, because all of the Likert-type items met criteria for normality, the data were treated as continuous. The factor loadings were rotated orthogonally to improve interpretability of the factor loadings. The EFA yielded a three-factor solution that accounted for 69.9% of the variance. A scree plot was utilized to help visualize the eigenvalues associated with the items within the scale and Catell's criterion, which suggests retaining the factors that are located above the elbow of the plot (DeVellis, 2003), was followed. See Figure A1 for a graphic of the plot.

The three factors were Caring (4 items, $\alpha=.85$; sample item: "My teachers care about me"), High Expectations (4 items, $\alpha=.87$; sample item: "My teachers encourage me to work hard in my classes"), and Equitable Treatment & Cultural Inclusion (4 items $\alpha=.83$; sample items: "The school provides instructional materials that reflect my culture" and "At this school, students of all races are treated the same"). Confirmatory factor analysis procedures were then performed utilizing the Study 1 sample (Cohort 1 and 2, Waves 2 and 1 respectively, $N=21,335$, $J=58$ schools) to test whether the three factors were influencing responses in the predicted way (DeCoster, 1998). Because all of the Likert-type items met criteria for normality, the data were treated as continuous in the CFA. The CFA indicated that a three factor model provided adequate fit to the data, $\chi^2(51) = 1463.86$, $p < .001$, comparative fit index (CFI) = .988, Tucker-Lewis Index (TLI) = .984, root-mean-square error of approximation (RMSEA) = .036, standardized root mean square residual (SRMR) = .029. See Figure A2 for a graphic of the model.

Students' Psychological Needs. Survey items were given on a four-point Likert scale and were adapted from the National Longitudinal Study on Adolescent Health (Resnick et al., 1997), the School Development School Climate Survey (Haynes et al., 2001), and the California Healthy Kids Survey (Hanson & Kim, 2007). An exploratory factor analysis of eight items based on $N=17,960$ students, $J=52$ schools from the Year 1 survey administration suggested a three-factor solution. A scree plot was utilized to help visualize the eigenvalues associated with the items within the scale and Catell's criterion (DeVellis, 2003) was again followed. See Figure A3 for a graphic of the plot.

The three factors were Belonging (3 items, $\alpha=.79$; sample item: "At this school, I feel like I belong"), Competence (2 items, $\alpha=.62$; sample item: "I believe I can do well in school"), and Autonomy (3 items, $\alpha=.74$; sample item: "At school, I help decide things like class activities or rules"). Confirmatory factor analysis procedures were then performed utilizing the Study 1 sample (Cohort 1 and 2, Waves 2 and 1 respectively, $N=21,335$, $J=58$ schools) to test whether the three factors were influencing responses in the predicted way (DeCoster, 1998). Because not all of the Likert-type items met criteria for normality, weighted least squares estimation was used in the CFA (the WLMSV estimator in Mplus). A confirmatory factor analysis on the current study sample found that a three-factor model provided adequate fit to the data, $\chi^2(17) = 989.786$, $p < .001$, comparative fit index (CFI) = .93, root-mean-square error of approximation (RMSEA) = .05 (.049-.054). See Figure A4 for a graphic of the model.

Measurement Invariance. In order to make structural comparisons between Black and White student groups, measurement invariance of the latent factor structure of all nine latent constructs in the model was tested. Demonstrating measurement

invariance prior to making structural comparisons between groups is necessary to test the hypothesis that a common factor structure describes both Black and White groups and to determine whether the meaning of the constructs is the same across groups (e.g., Furlong, O'Brennan, & You, 2011). Due to the ordinal nature of the data, the factor structure of a polychoric matrix rather than Pearson covariance matrix was analyzed to test measurement invariance (Koh & Zumbo, 2008). A multi-group CFA was conducted ($N=21,457$) using weighted least squares estimation in Mplus (WLMSV). Through a succession of nested comparisons to determine configural, metric, and scalar invariance, parameters were increasingly constrained to be equal and goodness-of-fit was assessed relative to the baseline (configural) model with each increasing level of restriction (Meredith, 1993). Configural invariance ascertains whether the groups have the same factor structure broadly speaking, and parameters are allowed to vary freely. Metric invariance, also called weak factorial invariance, ascertains whether the groups have the same factor loadings, and factor loadings are constrained to be equal. Scalar invariance, also called strong factorial invariance, assesses whether factor loadings and intercepts are equal. Measurement invariance is demonstrated when a) the multigroup model demonstrates an adequate fit to the data (i.e., chi-square test insignificance $>.05$, CFI $>.95$, NNFI $>.95$, and/or RMSEA $<.05$) and b) when differences in CFI between models are less than .01 (Cheung & Rensvold, 2002). With exception to the chi-square test, which is likely due to sensitivity to sample size, all of the remaining criteria were met. Comparing metric to configural models, the χ^2 difference = 21 ($\Delta df = 23$), $p < .001$, $\Delta CFI = <.001$, $\Delta RMSEA = <.001$, $\Delta SRMR = .001$. Comparing scalar to configural models, the χ^2 difference = 54 ($\Delta df = 55$), $p < .001$, $\Delta CFI = <.001$, $\Delta RMSEA = .001$. Fit statistics are reported

in Table A1. Factor loadings and standard errors for the configural model are reported in Table A2. Table A3 presents the correlations, means, and standard deviations of all latent constructs.

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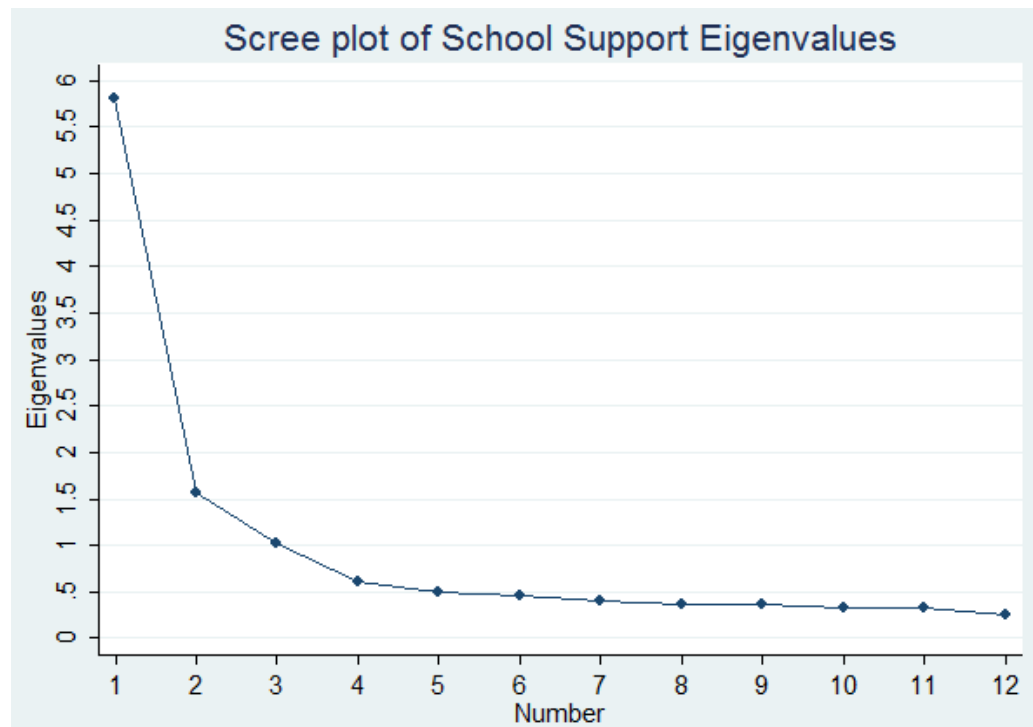


Figure A.1. Scree plot of school support eigenvalues.

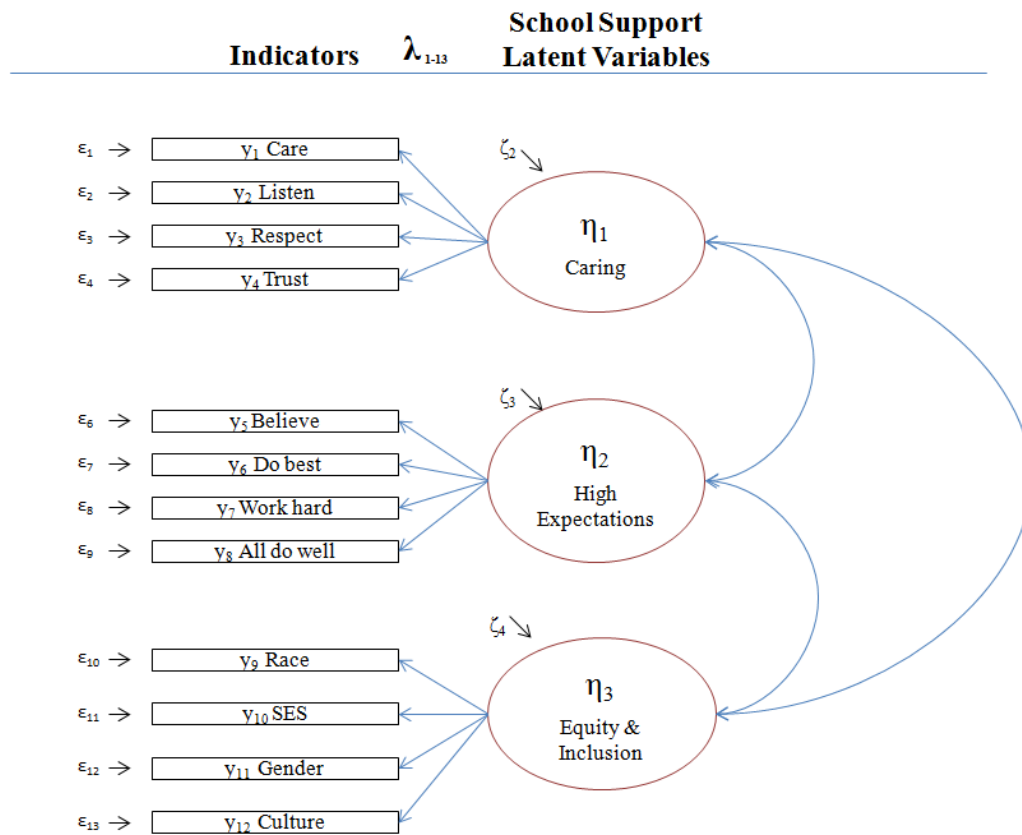


Figure A.2. Confirmatory factor analysis model of school support in Study 1.

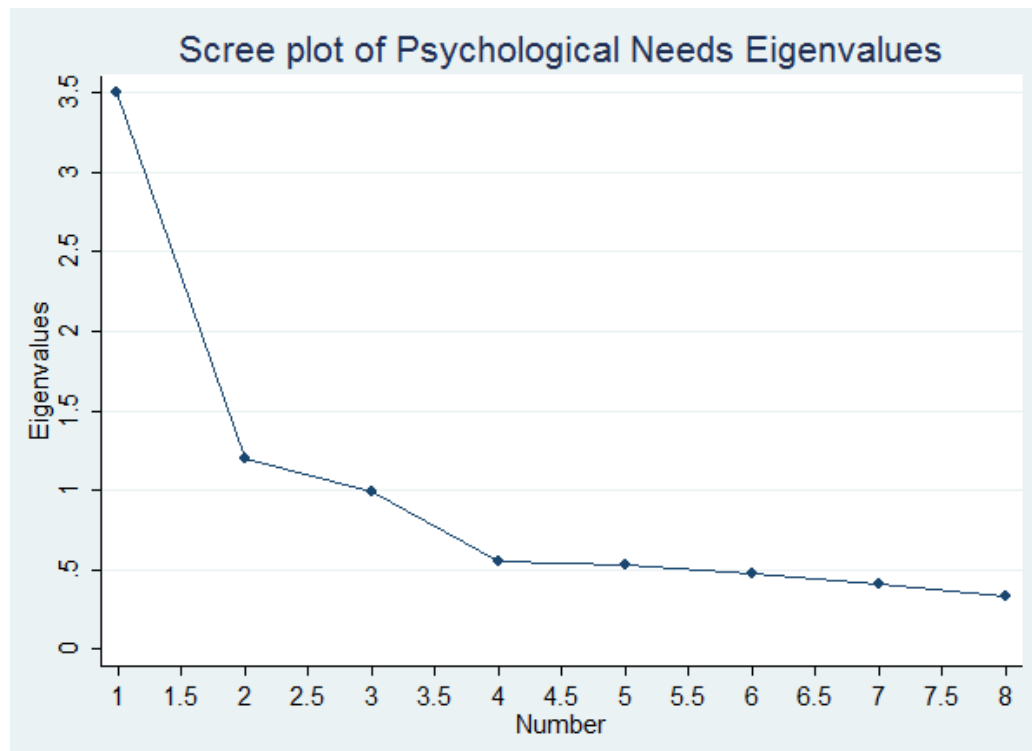


Figure A.3. Scree plot of psychological needs eigenvalues.

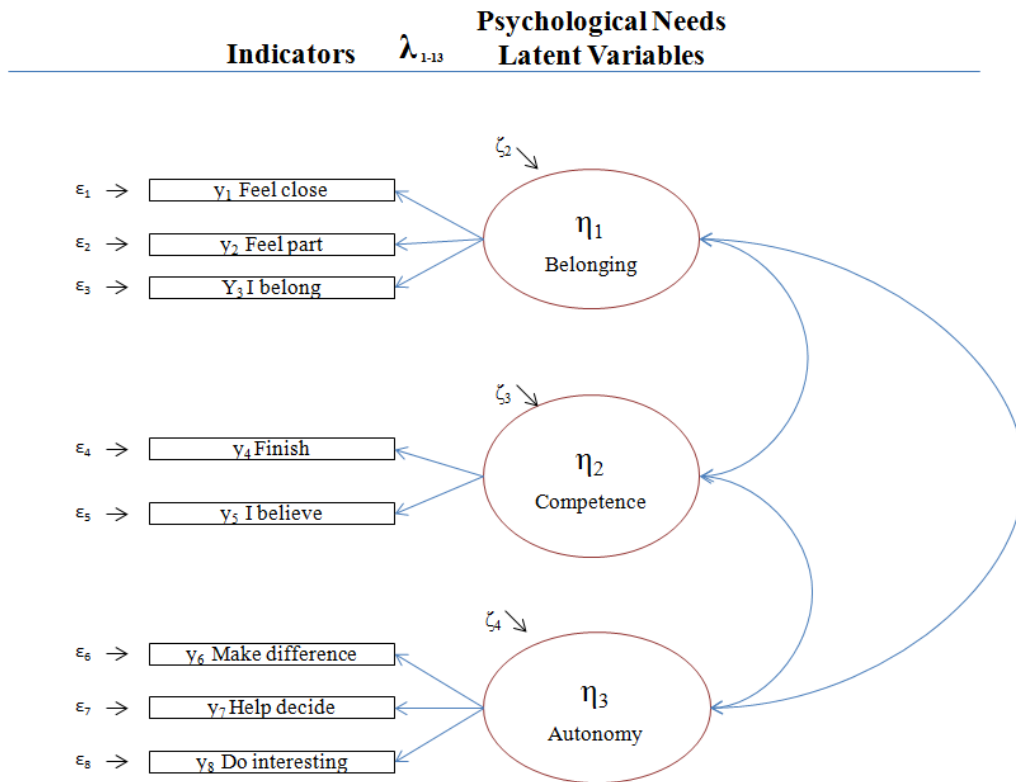


Figure A.4. Confirmatory factor analysis model of psychological needs in Study 1.

Table A1

Fit indices for measurement invariance tests across Black and White student groups

<i>Model and Invariance Level</i>	χ^2	<i>p</i>	<i>df</i>	<i>CFI</i>	<i>RMSEA(CI)</i>
Model 1: Configural Invariance	7756	<.001	856	.976	.027 (.027-.028)
Model 2: Full Metric Invariance	7777	<.001	879	.976	.027 (.026-.028)
Model 3: Full Scalar Invariance	7831	<.001	934	.976	.026 (.026-.027)

Note. χ^2 = Chi-squared statistic; CFI = Comparative Fit Index; RMSEA = Root-Means-Square Error of Approximation; CI = Confidence Interval.

Table A2
Confirmatory Factor Analysis Factor Loadings (N=21,457)

Item	λ	SE	<i>p</i>
School Support			
<i>Teacher Caring</i>			
My teachers care about me	.864	.003	<.001
My teachers listen to me when I have something to say	.819	.003	<.001
Teachers respect the students	.832	.003	<.001
Students trust the teachers	.749	.006	<.001
<i>Teacher High Expectations</i>			
My teachers believe that I can do well in school	.842	.003	<.001
My teachers encourage me to work hard in my classes	.844	.003	<.001
My teachers always want me to do my best	.892	.002	<.001
Teachers believe all students can do well if they try	.755	.004	<.001
<i>Equity & Cultural Inclusion</i>			
At this school, students of all races are treated the same	.797	.005	<.001
At this school, students are treated the same regardless of whether their parents are rich	.824	.004	<.001
At this school, boys and girls are treated equally well	.814	.004	<.001
The school provides instructional materials that reflect my culture, ethnicity, and identity	.723	.004	<.001
Developmental Needs			
<i>Belonging</i>			
At this school, I feel like I belong	.827	.005	<.001
At this school, I feel close to people	.719	.007	<.001
At this school, I feel like I am part of this school	.872	.005	<.001
<i>Competence</i>			
I believe I can do well at school	.848	.008	<.001
It is important to finish high school	.745	.007	<.001
<i>Autonomy</i>			
At school, I do things that make a difference	.748	.005	<.001
I help decide things like class activities or rules	.645	.006	<.001
At school I do interesting activities	.780	.005	<.001
School Engagement			
<i>Emotional Engagement</i>			
I enjoy learning at this school	.889	.004	<.001
I like coming to school	.808	.004	<.001
I like this school	.843	.005	<.001
Psychological Adjustment			
<i>Externalizing Problems</i>			
I have trouble controlling my temper	.880	0.004	<.001
I have threatened to hit or hurt someone	.743	0.007	<.001
I do things without thinking	.653	0.008	<.001
I get mad easily	.868	0.004	<.001
<i>Internalizing Problems</i>			
I am lonely	.803	0.005	<.001
I am sad	.846	0.004	<.001
I am worried something bad is going to happen	.627	0.006	<.001
I feel depressed	.921	0.003	<.001
I feel nervous or anxious	.713	0.006	<.001

Table A3

Zero-Order Correlations for All Continuous Latent Variables in the Model

Item	1	2	3	4	5	6	7	8	9
1. Equity & Inclusion	—								
2. Teacher Caring	.54	—							
3. Teacher High Exp	.45	.63	—						
4. Belonging	.45	.55	.50	—					
5. Competence	.26	.31	.56	.35	—				
6. Autonomy	.32	.44	.41	.50	.27	—			
7. Emotional Engagement	.43	.55	.50	.59	.32	.54	—		
8. Internalizing Problems	-.17	-.17	-.20	-.31	-.23	-.13	-.19	—	
9. Externalizing Problems	-.25	-.29	-.24	-.23	-.22	-.18	-.29	.44	—
<i>M</i>	2.669	2.687	3.110	2.789	3.563	2.376	2.528	1.857	2.073
<i>SD</i>	.731	.675	.684	.724	.591	.705	.831	.716	.788

Note. Correlations are all significant at the $p < .001$ level.

Appendix B: Curriculum Vitae

Jessika H. Bottiani, MPH, PhD Candidate

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PROFESSIONAL SUMMARY

Research scientist specializing in the evaluation of school conditions and interventions that promote child and adolescent mental health and healthy social emotional development.

- Skilled in quantitative analytic approaches with large-scale data sets
 - Modeling with latent variables utilizing *Mplus* software
 - Multilevel modeling in HLM and *Mplus* software
 - Data cleaning, merging, management, and analysis using commands in Stata
- Exceptional writing ability adaptable to research, policy, and practice audiences
- Outstanding organizational and interpersonal skills to manage and advance multiple projects
- Content expertise includes student engagement, school climate, development of motivation, youth violence prevention, culturally sustaining and responsive school practices, discipline disproportionality.

EDUCATION

May 2014 (expected)	Doctor of Philosophy, Mental Health Bloomberg School of Public Health Johns Hopkins University, Baltimore MD Thesis: Racial Inequities in Students' Experience of Positive School Climate Mentors: Dr. Catherine Bradshaw, Dr. Tamar Mendelson
2008	Master of Public Health Bloomberg School of Public Health Johns Hopkins University, Baltimore, MD Concentration: Human Development Certificate: Maternal & Child Health Capstone: Mamás y Bebés: A Case Study in Cultural Adaptation Mentor: Dr. Deborah Perry Student Leadership: President, Anna Baetjer Society for Public Health Practice
2001	Bachelor of Arts, cum laude Smith College, Northampton, MA Major: Comparative Literature (<i>Russian, American English, Chinese</i>) Minor: Russian Language Studies Junior Year Abroad in St. Petersburg, Russia; Middlebury Language School

GRANTS, HONORS, & SCHOLARSHIPS

2009-2014	US DOE Institute of Education Sciences Predoctoral Training Fellowship
2013	Gordis Teaching Fellowship, <i>Youth Violence Prevention: A Public Health Approach</i>
2010-2013	Johnson & Johnson Community Health Care Scholar
2010	UC Berkeley Summer Institute on Youth Violence Prevention Scholarship
2001	First Group Scholar
1998-2001	Dean's List

RESEARCH EXPERIENCE

2010-Present	<p>Research Fellow, Double Check Cultural Proficiency & Student Engagement Project, Johns Hopkins University (JHU) & Sheppard Pratt Health System Faculty Advisors: Dr. Catherine Bradshaw, Dr. Michael Rosenberg Contributed to grant writing to successfully obtain Institute of Education Sciences, Development and Innovation (Goal 2) funding for the project; developed and revised measures of cultural proficiency administered during the 3-year project; examine data to assess psychometric properties, including exploratory and confirmatory factor analyses; contribute to design of a teacher professional development on cultural proficiency; collect qualitative data from teachers and administrators in individual and group interviews.</p>
2010-2013	<p>Scholar, Johnson & Johnson Community Health Care Program, JHSPH Faculty Advisor: Dr. Fannie Fonseca-Becker Community Partner: African Family Health Organization in Philadelphia, PA Translated research knowledge into practice in partnership with a community-based health care organization. Built their in-house capacity to design and implement the monitoring and evaluation of the grant-funded interventions. Aided in the cultural adaptation of evidence-based interventions to respond to the needs and build on the strengths of African and Caribbean immigrant and refugee children and their families in Philadelphia.</p>
2011-2013	<p>Trainer, Maryland Safe and Supportive Schools (MDS³) Initiative Maryland State Department of Education, JHU, & Sheppard Pratt Health System Faculty Advisor: Dr. Catherine Bradshaw Aided in revisions of an observational measure of school climate; trained and calibrated observational data collectors; collected observational data at schools.</p>
2007-2013	<p>Research Assistant, Center for the Prevention of Youth Violence, JHSPH Faculty Advisor: Dr. Catherine Bradshaw Conducted literature reviews, contributed to manuscript writing, coded data from social information processing vignettes, contributed to grant-writing.</p>
2009	<p>Research Intern, Center for the Social Organization of Schools Supervisor: Dr. Martha MacIver Aided in database management tasks for a project examining early warning signs of drop-out in Baltimore City Schools; contributed to research briefs.</p>
2007-2008	<p>Research Assistant, Center for Injury Research & Policy, JHSPH Faculty Advisor: Dr. Andrea Gielen Contributed to the development of a new website communications strategy to translate and disseminate the center's research.</p>
2007-2008	<p>Research Assistant, Mothers and Babies: Mood and Health Research Program Georgetown University and JHSPH Faculty Advisors: Dr. Mimi Le, Dr. Deborah Perry Conducted qualitative analyses of a perinatal depression intervention video; documented protocol of cultural adaptation of an evidence-based intervention to a local Latina population in D.C. delivered at Mary's Center, an FQHC.</p>
2002	<p>Research Assistant, National Research Center on Asian American Mental Health, University of California, Davis Director: Dr. Nolan Zane, Supervisor: Dr. Janet Chang Administered experimental assessments for Cultural Dimensions Project.</p>

TEACHING EXPERIENCE

2013	Teaching Fellow <i>Youth Violence Prevention: A Public Health Approach</i> Supervisors: Dr. James Goodyear, Dr. Kelly Gebo The Johns Hopkins University Krieger School of Arts & Sciences Awarded competitive fellowship. Developed course syllabus and lecture content. Taught semester-long seminar to advanced undergraduate Public Health majors.
2013	Teaching Assistant <i>Social, Psychological, & Developmental Processes in the Etiology of Mental Disorders</i> , Course Instructor: Dr. Catherine Bradshaw Support online format of course by co-facilitating "Live Talk" sessions; assist students via the course bulletin board system (BBS), email, and in-person; and grade written assignments.
2010, 2011	Teaching Assistant <i>Introduction to Mental Health Services</i> , Course Instructor: Dr. Ramin Mojtabai Guest lectured; graded written assignments and exams; assisted students in-person and via email with questions; maintained online syllabus and library.

PROFESSIONAL EXPERIENCE

2009-2013	Consultant <i>The Sierra Health Foundation, Sacramento, CA</i> Review grant applications and make funding recommendations.
2008-2009	Program Officer <i>The California Endowment, Sacramento, CA</i> Developed project workplans, including objectives, outcomes, timelines, and evaluation benchmarks; conducted due diligence research, site visits, and monitoring and evaluation activities to advance mission; composed and defended monthly funding recommendations to a statewide, peer review Community Health & Elimination of Health Disparities goal team (average grant amounts from \$150,000 - \$400,000); engaged community partners in coalition-building, capacity-building, and health policy advocacy activities.
2006-2007	Program Associate <i>The California Endowment, Sacramento, CA</i> Managed grants portfolio of approximately \$850,000 annually in tandem with Senior Program Officer; composed monthly funding recommendations to a statewide peer review team; provided technical assistance and resources to grant applicants and grantees.
2003-2006	Institutional Giving Manager <i>Edgewood Center for Children and Families, San Francisco, CA</i> Spearheaded a foundation and public grants program to advance the agency's mission to improve child and family mental health in San Francisco and San Mateo counties; raised more than \$3.5M each year, representing 20% of the agency's annual revenue; supervised one institutional giving associate and several contract grant writers; promoted team building and improved morale as key member of management team; contributed to strategic planning and implementation as a member of agency's senior management team.

PUBLICATIONS

Peer-Reviewed

- Bottiani, J.H., Bradshaw, C.P., Rosenberg, M.S., Hershfeldt, P.A., Pell, K.L., Debnam, K.D. (2012). Applying Double Check to Response to Intervention: Culturally Responsive Practices for Students with Learning Disabilities. *Insights on Learning Disabilities*, 9(1), 93-107.
- Le, H. N., [§]Zmuda, J., Perry, D. F., & Muñoz, R. F. (2010). Transforming an evidence-based intervention to prevent perinatal depression for low-income Latina immigrants. *American Journal of Orthopsychiatry*, 80(1), 34-45.
- Bradshaw, C.P., [§]Zmuda, J. H., Kellam, S. G. & Ialongo, N. S. (2009). Longitudinal impact of two universal preventive interventions in first grade on educational outcomes in high school. *Journal of Educational Psychology*, 101(4), 926-937.

Chapters and Papers in Edited Volumes

- Bradshaw, C. P., Bottiani, J., Osher, D., & Sugai, G. (2014). Integrating Positive Behavioral Interventions and Supports (PBIS) and Social Emotional Learning. In Weist, M.D., Lever, N. A., Bradshaw, C. P., & Owens, J. (Eds.). *Handbook of School Mental Health: Advancing Practice and Research* (second edition; pp. 101-118). New York: Springer.
- [§]Zmuda, J.H., & Bradshaw, C.P. (2012). Social and emotional learning and academic achievement. In Hattie, J., & Anderman, E.M. (Eds.), *International Handbook of Student Achievement*. New York: Routledge.
- Bradshaw, C. P., [§]Zmuda, J. H., Petras, H., Schaeffer, C. M., & Ialongo, N.S. (2012). Trajectories of aggressive-disruptive behavior. In R. J. Levesque (Ed.). *Encyclopedia of Adolescence* (pp. 2996-3003). New York: Springer.

Submitted for Publication

- Bottiani, J.H., Bradshaw, C.P., & Mendelson, T.M. (under review). *Racial inequalities in experience of school support among Black and White high school students.*
- Debnam, K., Pas, E., Bottiani, J.H., Cash, A.H., Bradshaw, C.P. (under review). *An examination of the association between observed and self-reported culturally responsive teaching practices.*

Manuscripts in Preparation

- Bottiani, J.H., Bradshaw, C.P., & Mendelson, T. (2014). *Fostering equitable school support through improved school organizational health.* Manuscript in preparation.
- Bottiani, J.H., Bradshaw, C.P., & Mendelson, T. (2014). *Examining the school discipline gap as a moderator of racial disparities in student connectedness and social emotional health.* Manuscript in preparation.
- Bradshaw, C.P., Debnam, K.D., Bottiani, J.H., Pas, E., Reinke, W., Herman, K., Rosenberg, M. (2014). *Coaching teachers to reduce disproportionality through cultural proficiency: Preliminary impacts of the Double Check model.*

[§] Jessika H. Bottiani, née Zmuda

CONFERENCE POSTERS & PRESENTATIONS

- Bottiani, J.H., Debnam, K., & Bradshaw, C.P. (2014, March). *Equitable School Support: An Approach to Reducing Racial Disparities in Student Engagement and Social-Emotional Health.* Oral presentation at the Society for Research on Adolescence Biennial Conference, Austin, TX.

- Bottiani, J.H., Debnam, K., & Bradshaw, C.P. (2013, June). *Enhancing Teacher Cultural Proficiency through Improved Measurement: Exploring the Factor Structure of Cultural Proficiency Continuum Measures*. Poster session presented at the Society for Prevention Research Annual Conference, San Francisco, CA.
- Bottiani, J.H., Bradshaw, C.P. (2013, June). *Understanding the Schooling Experiences of Children of Immigrants: The Role of Discrimination, Psychological Adjustment, and Academics*. Poster session presented at the Society for Prevention Research Annual Conference, San Francisco, CA.
- Bottiani, J.H., Debnam, K., Larson, K., & Bradshaw, C.P. (2012, December). *Enhancing Teacher Cultural Proficiency to Bridge the Discipline Gap: Measurement Challenges in the Evaluation of Intervention Effectiveness*. Poster session presented at the Summit on the Science of Eliminating Health Disparities (sponsored by the National Institutes of Health), National Harbor, MD.
- Bottiani, J.H., Waritay, O.R., & Fonseca-Becker, F. (2012, December). *Preventing Obesity among African and Caribbean Immigrant and Refugee Children in Philadelphia: A Multisectoral Effort to Measure Effectiveness*. Poster session presented at the Summit on the Science of Eliminating Health Disparities (sponsored by the National Institutes of Health), National Harbor, MD.
- [§]Zmuda, J. H., Bradshaw, C. P., & Eaton, W.W. (2011, June). *Predicting substance use and depression in young adulthood: examining the role of adolescent depression*. Poster session presented at the annual meeting of the Society for Prevention Research, Washington, D.C.

[§] Jessika H. Bottiani, née Zmuda

PROFESSIONAL AFFILIATIONS

- Society for Prevention Research, Member
- Society for Research on Adolescence, Member
- Society for Research on Educational Effectiveness, Member

SPECIAL TRAINING

- Summer Institute on Youth Violence Prevention at UC Berkeley Center on Culture, Immigration, and Youth Violence Prevention. August, 2010.
- Data & Democracy Community Assessment Train the Trainer Course, UCLA Center for Health Policy Research, Health DATA (Data, Advocacy, Technical Assistance) Program, Fresno, CA. February 2009.
- AskCHIS (California Health Interview Survey) Daylong Training Workshop, UCLA Center for Health Policy Research, Health DATA (Data, Advocacy, Technical Assistance) Program. Sacramento, CA. March, 2009.
- Grantsmanship, *The Grantsmanship Center*, Los Angeles, CA. Five-day training teaching effective methods for program planning and proposal development. January, 2006.
- Domestic Violence Training, *La Casa de las Madres*, San Francisco, CA. 40 hour sensitivity training on working with victims of domestic violence. August, 2003.

TECHNICAL SKILLS

- Statistical software including STATA, SPSS, HLM, and Mplus
- Online abstract and full text digital library databases (PubMed, PsychINFO, ERIC)
- Microsoft Office Suite (Word, Excel, PowerPoint)
- Online bibliographic management systems (EndNote, RefWorks)
- Conversational Russian and Mandarin Chinese (18 months abroad in Russia & Taiwan), basic Spanish